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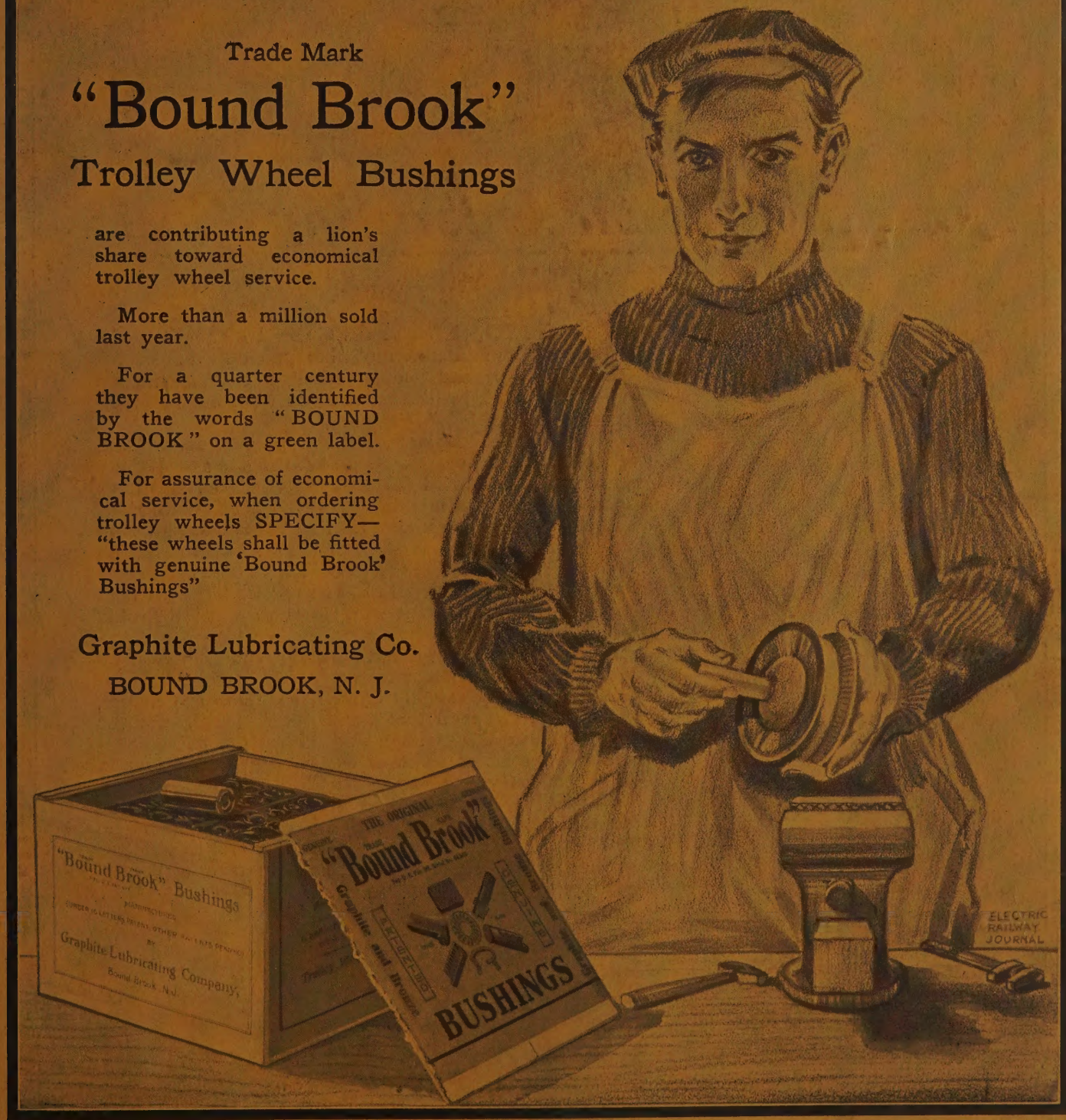

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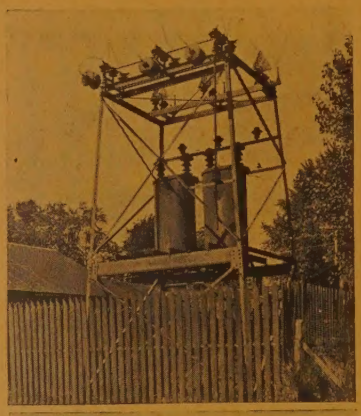
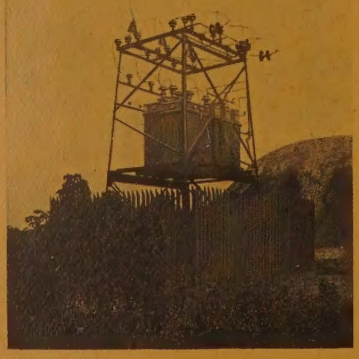
Cutting Down Operating Costs





"HELLO, Joe," said the General Manager to the Superintendent, "what do you think of the overhead construction and transmission work in Illinois that you went out to investigate?"

"It was fine," answered the Superintendent, "and I've written a report on it. Those fellows out there seemed to have studied the situation carefully, and have shown me there is something else besides railroading for a railroad man to think about. I've been reading up on diversity factor and such stuff, and if we don't get in on the power game, we'll miss a good bit. There are lots of towns and villages on our right-of-way; we have the high tension lines all up and it won't cost us much to install those out-door transformer substations which the Westinghouse Electric Company are putting out. There is no expensive construction and no costly supervision for operation. I have roughly figured that there are enough places along the road that want power, to pay for the upkeep on our high-voltage line. Here are some snapshots that I took of some of the outdoor substations in Illinois that are giving fine service."

"Well, Joe," said the General Manager, "since you've been taking some of the load off my shoulders lately, I've been thinking about that same idea, and as you feel it is the right thing, go to it. That's one way of cutting down operating costs."

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AN EASY WAY TO RAISE RATES

As a footnote to the discussion of labor conditions under municipal ownership, in the ELECTRIC RAILWAY JOURNAL of March 14, Italy provides an example of what to expect in case of labor trouble under government ownership of railways. Faced by a threat of a strike involving 100,000 state railway employees, the premier has agreed to pension and wage increases that will cost $3,000,000 annually, and he informed the Chamber of Deputies on Sunday, in what the press reports suggest to be an off-hand manner, that this sum was "to be obtained by increasing the railway rates." The system here exhibited has at least the merit of simplicity and dispatch. There are no long drawn-out hearings and investigations such as are necessary here to adjust wages or to increase rates. But of course the money to pay for the premier's liberality will come out of the pockets of Italian travelers and shippers, and in the long run it is very doubtful whether or not they will enjoy repeated experiences of this character which, history shows, are to be expected under municipal or government ownership of public utilities.

PUBLICITY ABOUT CAR DESIGN

A recent fuse scare on a fully-inclosed car of one of our larger city railways is a warning of the importance of acquainting the riding public with the entrance and exit features of radically new cars. The fully-inclosed car has now become a permanent feature of present electric railway practice, and its use is sure to grow on account of the intrinsic merits of the design. But while avoiding many of the evils of the previous types of car it has brought with it some problems of its own, and these must be settled in the right way if the car is to be as successful as it should be. One of these problems is that of the best way of avoiding disastrous results from a panic among the passengers. In the case in question a fuse under one of the seats blew out, and its careless replacement resulted in some flashes which burned the motorman and conductor slightly as they tried to correct the trouble. In the meantime disorder prevailed among the passengers, who actually thought there was no way for them to get out of the car except by smashing the doors. They did not even realize how easy it was to open the windows. Unfortunately, the motorman and conductor also lost their heads, and a serious accident was avoided only through the coolness of a policeman, who ran up to the car and pulled down the trolley pole. Of course, the fuse should not have been inserted with the power on, but a similar panic might have been caused by a fight or in a dozen other ways. For this reason instructions to the car crew only as to what to do in cases of emergencies will not suffice. In all fully-inclosed cars, whether of the center-entrance or end-entrance type, it will be well to post notices over the place where the door-operating devices are installed explaining how the doors may be opened, on the same theory that passengers on steam trains are kept acquainted with the location of the emergency levers of the airbrake and of the emergency toolbox.

CLASSIFIED ACCIDENT RECORDS

Two of the papers at the recent New York electric railway convention laid stress upon the value of classified accident records in determining what are the most important problems in accident prevention. The point is an excellent one. Accident prevention, while by no means a new subject, has received special attention only during the last few years, and, naturally, its features of greatest importance are not yet generally understood, nor is there any general agreement upon their character. As an example of the application of accident statistics to a definite problem, Edward A. Maher, Jr., of the Third Avenue Railway, found that boarding and alighting accidents on that system constitute 38.5 per cent of the total number and that they were being absolutely eliminated by the installation, on all cars, of folding doors and steps. This figure is a percentage of the number of accidents only and does not take into consideration the relative seriousness of the injuries, but assuming that the actual number is a rough approximation of the assessed damages Mr. Maher has determined that an expenditure of $310 per car for installing the extra safeguards will pay for itself in two years. This instance shows that some parts of the accident problem, at least, are capable of a solution that will bring a big return, even judged solely from the standpoint of dollars and cents. It also shows that possibly other phases of the question may be approached in a similar way. For example, if Mr. Maher's figures regarding the relative number of the accidents to children under fifteen years of age—4 per cent of the total—may be considered as representative, it is worth consideration whether the safety campaigns in the schools are as immediately important as the introduction of some means for eliminating boarding and alighting accidents, amounting to 38 per cent of the total, and for reducing the number of collisions with pedestrians and vehicles, amounting to 37 per cent of the total.

STANDARD RAIL SECTIONS

In probably no other department of electric railway construction would greater economy come from standardization than in that of rail sections. Every variation in the section of a rail, no matter how slight, means a change in the rolls, and one of the complaints of the rail manufacturers in the past has been that the conflicting ideas or whims of railway companies have compelled the mills to keep in stock a large number of sets of rolls. For this reason the work on standards of the way committee of the Engineering Association and the adoption of these standards by the companies promise more direct results in the way of economy than almost any other, because the cost of maintaining the present variety of sections must necessarily be borne by the users of rails. Mr. Schreiber's article in this week's issue reviews in a most interesting way the development of rail standards by the Engineering Association and illustrates those recommended by the committees in past years. The latest sections are the result of this experience and presumably represent the best thought of the way engineers of the country for a desirable section. To have accomplished this much is most commendable, but it will be of little practical value unless the railway companies order enough rails of the present standard sections to warrant the manufacture of the necessary rolls. As yet no one can use these rails because no rolls have been cut for them. Would it not be well at the next meeting of the Engineering Association to take up this question of their practical adoption? The proposed sections will then have been before the industry for a year and a census of those who think sufficiently well of them to purchase rails of that type should be possible.

WHAT CONSTITUTES A SIGNAL FAILURE?

In view of the records of signal operation which are now becoming available, the various railways that have installed automatic signals or are about to install them certainly ought to unite on some uniform definition of what constitutes a signal failure. At present no definite rule exists, and as the number of failures is an extremely small proportion of the total number of signal movements, a slight difference in definition may cause the signals on one road to show a record very much better than those of another line where conditions are otherwise comparable. Certainly there is no sound reason for thus denying the stimulus of comparative records to the performance of automatic signals.

On one system a signal failure is charged for each train that is improperly stopped by a signal regardless of how or why the signal happens to be in stop position, and in addition, of course, the converse also applies. Exception to such a drastic rule as this has been taken on the ground that it is hardly proper to say that a signal has failed when a derailed car has knocked down a pole carrying the signal wires, or when a short-circuit of the signal-power wires is caused by exterior circumstances, such as a wire falling from some other circuit. In such cases it is said, and with a considerable degree of justification, that if the signals go to stop position they have fulfilled the duty for which they were designed.

Strictly interpreted the broadest ruling would involve charging a signal failure when a train was stopped on account of a broken bond, although this action has been held as one of the most important features of the track-circuit-controlled signal systems. Be this as it may, the fact remains that electric railway signal engineers today have no uniform basis for signal operating records, and judging from the excellent arguments put forward in favor of each of the various existing definitions of a signal failure, this uniform basis is not likely to be reached by any other method than weight of personal belief. We would welcome, therefore, expressions of opinion on this question from signal engineers throughout the country.

INHERITED DISCREPANCIES IN FARES

A result of consolidation which often gives trouble to the management of the system thus formed is the discrepancy between fares frequently found on different lines. Such conditions not seldom lead to charges of discrimination before public service commissions. The defence of cases of this kind is usually burdensome, not because the management is conscious of any desire to treat any portion of the territory with favoritism, but because equal service for equal compensation appears at first sight a sound doctrine. It is difficult to convince the layman that because he can ride 7 miles for a 5-cent fare on one line, it by no means follows that he should be allowed to travel a like distance on another line at the same rate, yet this can be done if all the facts are presented in clear form to intelligent patrons.

In many fare cases it is possible for the company to point out that it is carrying passengers at a loss on the line selected by the petitioners for comparison. No real reason exists why the fares on a consolidated line should be reduced to an unprofitable level because those elsewhere on the system are unduly low. Many of these situations result from rash promises by promoters, usually verbal, and unless they are legal obligations inherited by the consolidated company it is hard to see why the latter is bound to observe them, even as an ethical matter. Too great rigidity in the matter of fares as time passes is injurious to the community as well as to the company, for it stifles development in a score of ways. Again, special circumstances often fix fares on apparently similar lines, such as a heavy industrial traffic morning and night, the establishment of colonies of summer homes, Chautauqua assemblies, or steam railroad competition. Much can be done by emphasizing the improved quality of service resulting from a consolidation, by tabulating the maximum distances purchasable per fare, including transfers, by calling attention to the shortening headway on the disputed line, and by making it plain that while it is out of the question for every line on a system to earn a profit, every local reduction in revenue draws more heavily upon other portions of a road and must be

made up somewhere in obtaining a reasonable return. Actual estimates of service cost are more convincing as a rule than pro-rated car-mile expenses applied to a particular line, and when the former are considered in connection with the total earnings and expenses of the system, the best basis for a just decision is secured. The co-ordination of fares on consolidated lines is a subject bound to demand more attention in the future, but in the meantime the income and expense analysis of specific lines will do much to disarm hostility in dealing with inherited discrepancies.

ENLISTING THE CO-OPERATION OF EMPLOYEES

Progressive managers of electric railways are uniformly of the opinion that a sympathetic interest in the welfare of an operating company on the part of the employees, of whatever rank, is one of the most important factors in the success of the enterprise. On small roads it is easier to cultivate such an interest than on great properties where the personnel is constantly changing and where the men behind the controller and the punch are out of personal contact with many of their superior officers. It is a good sign, however, that the ablest operating officials are trying to come into closer touch with their men than formerly, and one particularly successful superintendent remarked recently that he hardly dared to appear on the most congested street corner of the system in the rush hours for fear of delaying traffic through the voluntary salutes of motormen. Attendance of officials at employees' social events, sports, etc., helps to create a better mutual understanding and to enlist the energies of the men, whether members of the union or not, on behalf of good service and loyal support of the company.

Sometimes it is necessary to appeal to the men through printed bulletins in which particular problems may be clearly discussed from the point of view of the management, giving more time for their consideration than is afforded in a short personal talk. An instance of this procedure on behalf of co-operation was furnished recently by the Boston Elevated Railway Company, following the award of increased wages and improved working conditions to the men in the service by the late arbitration board. To acquaint the employees with the situation, which involved a serious cut in the company's dividend rate, President Bancroft issued a bulletin pointing out that the public has not been affected by the decision of the board; that the employees, through shortened hours, raised wages and other bettered conditions, have been benefited, and that the investors, through a reduced dividend, have been affected adversely. It was stated that the investors, at most, have never received more than a modest dividend and that in fairness it ought to be restored. The letter showed that if, through the diligence of conductors, one fare per half trip could be saved from loss, the increase in income to the company would be $672,177.70 annually, and the co-operation of the motormen was specially urged toward reducing the present average yearly cost of accidents of $700,716. In simple, plain terms the possibility of every employee doing something to increase the company's revenue or to save it from preventable loss was set forth, and the conclusion was drawn that it is the duty of every employee to aid the company to carry the heavy burden placed upon it by the award. The closing statement called the attention of the men to the fact that the company's future car revenues and accident record will show what the employees have done toward restoring the dividend.

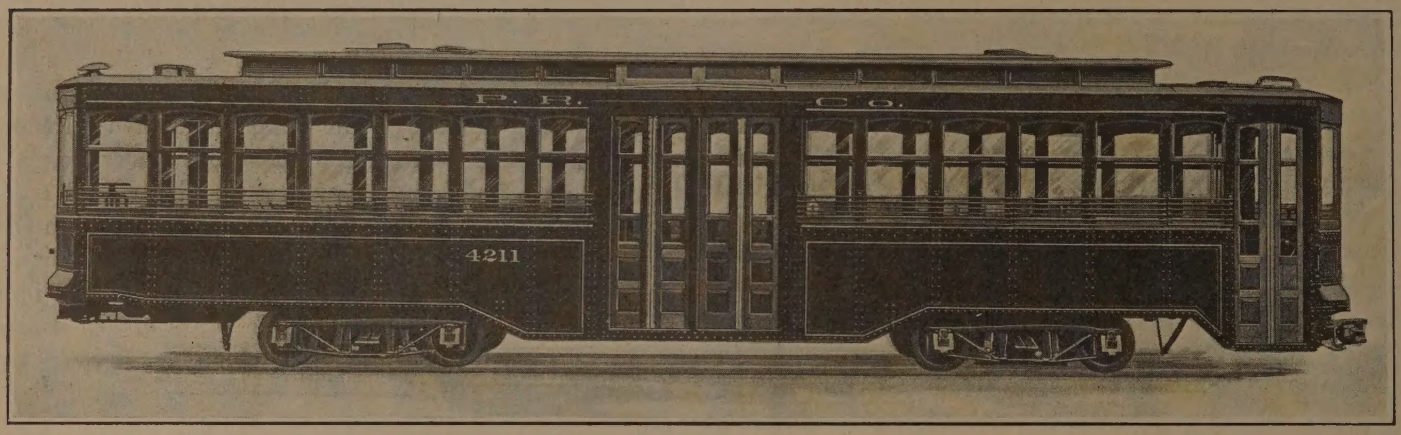
Frank discussions of this kind are bound to be received in a spirit of good will by employees capable of realizing the need of fair play for investors as well as for those in the service, and when such bulletins are worded in straightforward language on a man-to-man basis, their appeal is sure to be heeded by many of the rank and file who daily handle the detailed problems of serving the public safely and efficiently. The trouble in the past in this country has been that too often "the company" has meant nothing but a machine to those working for it in humbler capacities, and the realization of the very human needs of its stockholders, many of whom are persons in anything but affluent circumstances, has not been pressed home to the average platform man. The latter visualizes the influential company banker as the typical stockholder rather than the small merchant in the suburban town or the widow of the high-school principal, whose savings have gone into the securities of the road through years of self-denial and who feels the pinch of a cut in dividends certainly as keenly as motorman '8000" feels a protracted "layoff."

There is room along these and similar lines for very effective educational work. The keynote of it all should be "co-operation." The effort should be made, by both precept and example, to instill the idea that the interests of the employee and the employer are largely the same. The doctrine of antagonism between capital and labor preached by the I. W. W. (or "I Won't Work") advocates is largely imaginary. Theoretically, it may sound reasonable to argue that the interests of capital and labor are diametrically opposed because capital wishes to buy what labor has to sell, hence capital is interested in reducing wages to the lowest point, while labor is interested in pushing them to the highest point possible. Practically, the employee prospers most when the company for which he is working is prosperous, and conversely, the company will get more real service out of its men and will be most prosperous when they are contented. Here is an important educational opportunity. Practical welfare work, such as a number of companies have undertaken, will help considerably along these lines, as it will show the interest which the company takes in the social condition and home life of its men. Profit sharing in some form is also helpful in promoting a spirit of mutual understanding, and the benefits following the investments by employees in the corporation for which they are working are but little realized in the railway field, although the plan has been carried out successfully in the industrial field.

Center-Entrance, End-Exit Cars for Pittsburgh

The Pittsburgh Railways Company Has Adopted as Standard a Modification of the Low-Floor Car Which Has Many Novel Features, Including a Four-Motor Control System Operating Without Resistance

After experimenting for a period of nearly two years the Pittsburgh Railways Company has adopted as standard a type of car that possesses many unusual features. Foremost among these are the small motors and wheels that permit the car floor to be kept down to a point which, in the center of the car, is only 24¾ in. above the rail. In this respect the new cars follow the principle developed in the original low-floor car used in Pittsburgh and described in the Electric Railway Journal for Aug. 3, 1912. Since that car was built, however, numerous improvements have been introduced. The lot of fifty cars which is now being shipped by the St. Louis Car Company differs from the original type in many particulars.



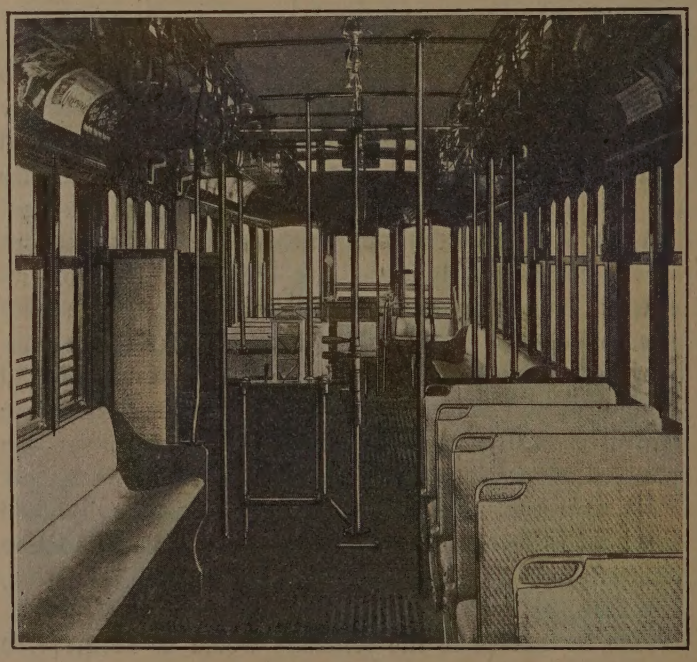
Pittsburgh Car—Side View Showing Center Doors and Front Exit

First among these is the use of a front exit as an auxiliary to the center doors with which the car is furnished. This really makes the car a compromise type, because the two doors at the center are not used to provide a separate exit and entrance, but are made thoroughly flexible in their use, so that, if desired, both may be used as an entrance or both as an exit. There is no definitely assigned path for the movement of passengers, the conductor directing the movements of the passengers in and out of the car in accordance with the immediate needs.

This radical departure from the usual custom of training the public along rigidly-prescribed lines is stated to have been adopted on account of the peculiar conditions existing in Pittsburgh. In that city it is customary, on outgoing cars during the rush hour, for all passengers to be loaded at three or four loading points within the restricted business district. They may be carried for several miles before any unloading takes place and then are dropped off in small groups as on an ordinary suburban line. The exact reverse of this process takes place with inbound cars, and in consequence the use of both center doors for an entrance or for an exit is of distinct value in decreasing the time of stops.

The front exit door is under the control of the motorman, and it provides a means for short-distance riders to get off the car at congested loading points without interference from incoming passengers. It also eliminates the necessity for the conductor to leave the center doors open and unguarded when he gets off to throw a switch or to signal to the motorman at grade crossings. A mirror is installed over the right-hand front window at each end of the car so that the motorman may see what the conductor is doing without having to turn around. The mirror also warns the motorman of passengers moving to the front of the car to make use of the front exit door. This mirror is set at the maximum possible height so that there is no danger of the motorman's view being obscured by the heads of standing passengers.

When the car is in operation the conductor stands beside a stanchion which is placed in the exact center of the car, and entering passengers pass on either side of him in case both center doors are used for entrances. On this stanchion are two handles for operating the doors so that the conductor has no need of moving out of his position. The fare box is carried in a frame of gas pipe that is hung from the center stanchion. It may be swung around on its support to either side of the car, and when the car is in operation it is located immediately in front of the open doors, thus



Pittsburgh Car—Interior View Showing Arrangements of Seats and Swinging Fare Box Supported on Stanchion in Center of Car

providing a clear space in front of the passengers who make use of the folding seats along the doors on the blind side of the car.

There are only two handles for operating the doors, and they are carried on the center stanchion. Each of these handles operates one of the two doors on the entrance side of the car. When the car changes ends and the doors on the opposite side of the car are to be used, the operating rods which extend over the center stanchion to the operating mechanism of the door are disconnected, swung around to the other side of the car and connected to the operating mechanism of the opposite doors. The connections are made by easily-removable pins, and in order to avoid any possibility of wrongly connecting the doors one of the two operating mechanisms on each side and one of the rods are painted red, and the others are painted black.

The destination signs are located in the monitor over the center doors, and at each end of the car is a large, illuminated route-indication sign in a wooden frame.

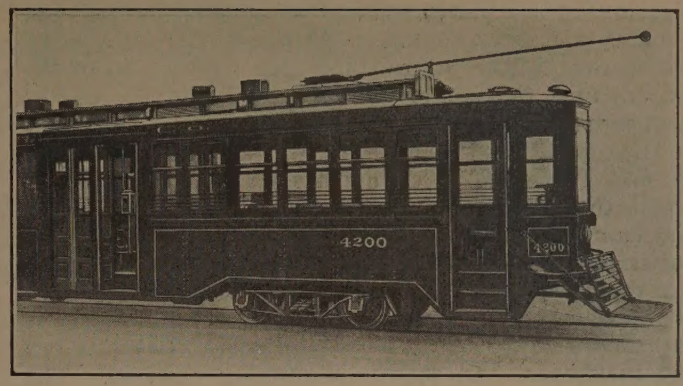
SEAT AND STEP ARRANGEMENT

The seating arrangement, as shown in the accompanying plan of the car, is a combination of cross and longitudinal seats, the longitudinal aisle seats provided in the original low-floor car having been abandoned on

Pittsburgh Car—View Showing Stationary End Seats and Location of Control Handles—Motorman's Mirror Over Right-Hand End Window

account of the difficulty which they introduced in the interior movement of passengers. The ends of the car are provided with circular seats, no bulkheads being installed. There is also provided a single seat attached to stanchions at each end of the car. The stanchions are used primarily to support a folding seat for the motorman and to act as guides for a curtain at the motorman's back to keep the lighted interior of the car from obscuring his view at night. Folding seats are located in front of the unused doors on the blind side of the car.

There is a ramp in the floor between the trucks and the center. This gives a rise of 3 in. and, together with a transverse ramp between the step and the longitudinal center line of the car amounting to 1 1/16 in., it makes the minimum floor height 24¾ in. This is divided into one 15¼ in. step from the ground and one



Pittsburgh Car—View Showing Interior Steps at Center and Front Doors

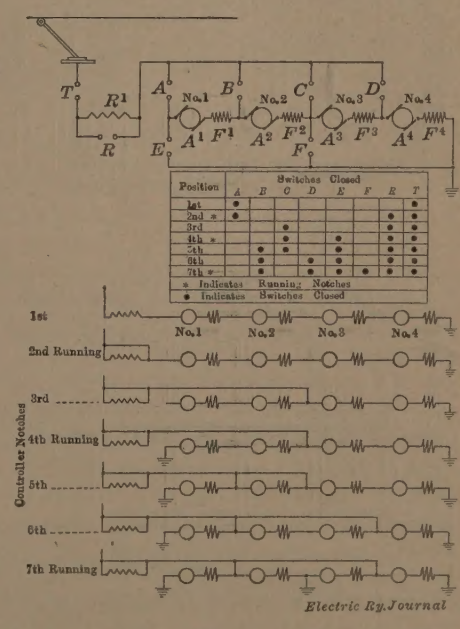
9½-in. interior step. At the front exit the floor height of approximately 2 ft. 5 in. is divided into three steps, of which two are interior and are about 8½ in. each.

A notable innovation is the use of immovable semi-circular seats at both ends of the car. The controller at each end is set below the seat and the shaft is extended up through the seat and through a pipe railing slightly above the ordinary height of an arm rest. When the car is being operated in either direction the controller and reverser handles are put in place on the shaft of the controller drum, the motorman standing in back of the fixed seat at the front end. The controller drum handle extends through the hollow reverser shaft so that both handles have the same center. Through the pipe-railing also extends the shaft of a mechanically-operated sander, and at the right of the motorman another piece of pipe railing affords a support for the removable hand-brake wheel and air-brake handle. At the rear end of the car all of these handles are removed, leaving the pipe railings with no projecting pieces and permitting passengers to use all of the end seats.

The doors are all of the interior combined swinging and sliding type which is standard on the Pittsburgh Railways. All are mechanically operated by short handles on interior stanchions. The approximate net door opening is 2 ft. 4 in. It will be noticed from the plan of the car that while the extreme width is 8 ft. 2 in. the ends of the car are reduced in width to 7 ft. This has been done on account of clearance difficulties in the city of Pittsburgh. The cars, complete with double-end control and couplers at each end, weigh 38,000 lb.

CONTROL WITHOUT RESISTANCE

The greatest novelty in the car equipment is the use of a new form of controller. This, like the small



Pittsburgh Car—Diagram Showing Control Connections

motors, has been developed and patented by P. N. Jones, general manager Pittsburgh Railways. It operates by using a permanent series connection between all of the motors in a four-motor equipment without the use of any resistance.

The operation is shown in the accompanying diagram. There are seven notches on the controller, of which three are running positions. On the first notch the four motors are connected in series through a small resistance which is used only to avoid the jar of starting when the gears and pinions are worn so that back lash exists between the teeth. The second notch of the controller leaves all motors in series, but cuts out the resistance, and this is a running position. The resistance remains cut out on all subsequent notches.

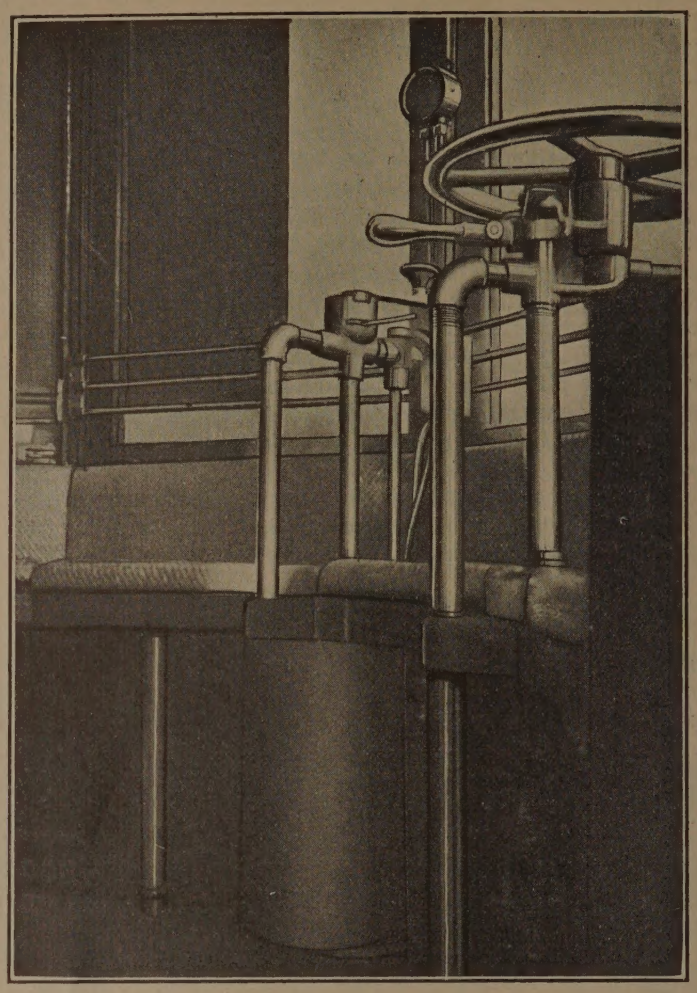
The third controller notch connects two motors in series, leaving the other two to run idle, thus giving an easy transition to the fourth controller notch in which the motors are connected in series-parallel. This is a running notch.

In the fifth position of the controller handle two of the motors are left in series, and one of the other two motors takes full voltage, the third motor running idle. In the sixth position one of the two motors in series is cut out, the car being propelled during this period by two motors, each of which takes full voltage. In the seventh position, which is the notch for full speed running, all motors are in parallel and take full voltage. Switches marked *A* and *E*, and *C* and *F* are interlocked to prevent any possibility of simultaneous closure, and consequent short circuit.

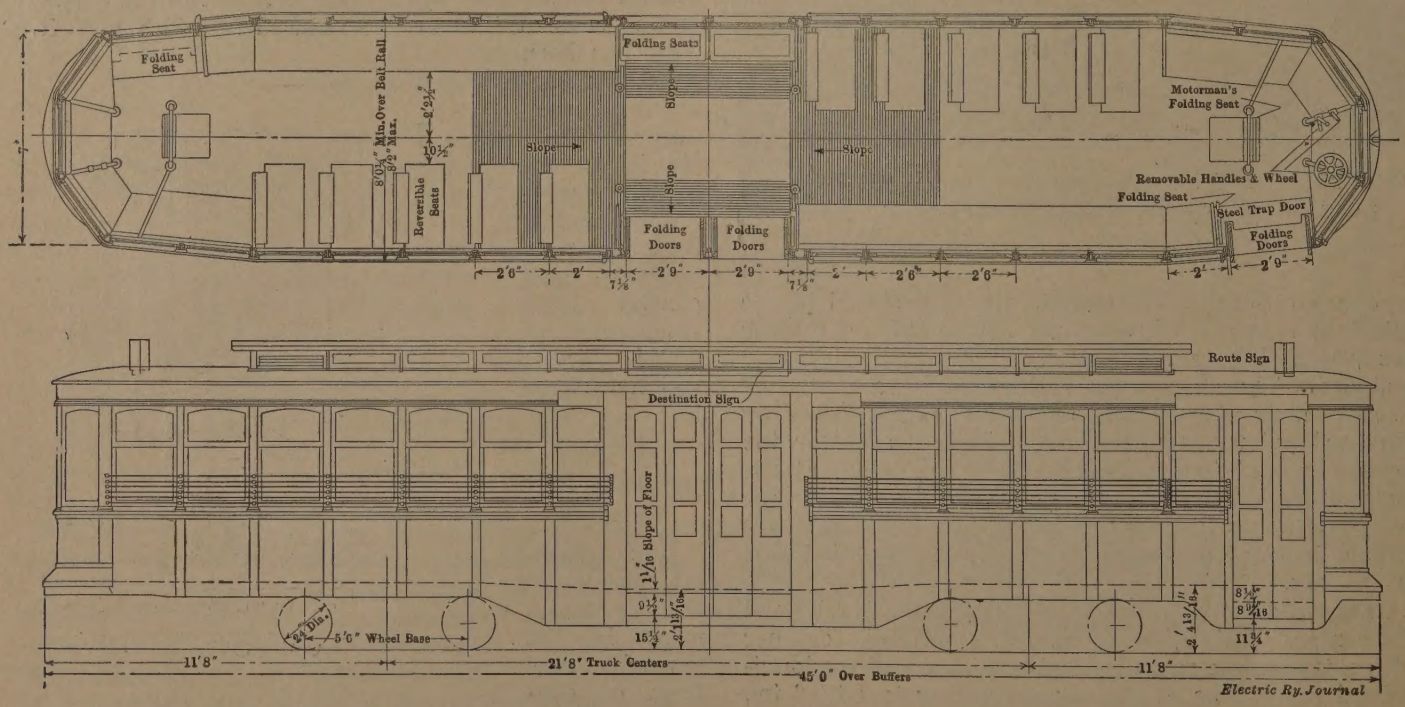
The control system is operated by a master controller and a switch group with eight unit switches specially designed for light weight and small bulk. This number includes the usual main-line circuit-breaker, which has a reset and is closed in all operating positions of the controller. It may be said that a drum controller operating on this principle has been built with the idea of eliminating remote switches and master control, but it has not as yet been put into service. It was made up from an old K-11 drum controller with two of the segments omitted.

It will be noticed from the diagram that motor No. 4 is in circuit all the time, whereas the other motors have variable periods of interruption during acceleration. However, it has been found that this No. 4 motor does not tend to get hot because on all of the running notches the work is evenly distributed between all four motors.

The line switch installed in the main circuit is of the simplest magnetically-operated type, and although the



Pittsburgh Car—Control and Air Brake Handles Supported on Pipe—Bracket at End of Car



Pittsburgh Car—Plan and Elevation Showing Door and Seat Arrangement

original controller has been in use for more than one year it is still operating satisfactorily. However, both the main switch and the bridging cut-outs for the motors have been in a process of development until very recently and details as to their construction are not available.

Owing to the practical elimination of resistance and to the method of making the transitions, the new controller has eliminated most of the losses inherent in the older types. To demonstrate the extent of this saving a comparative test was made between two cars of exactly the same weight and with the same equipment. One was equipped with the new controller and one with a controller of the standard type. The test lasted during a period of three months, and the cars changed runs every day; that is to say, a certain crew would handle one car on one day and the other car on the next day.

The trucks were interchanged every few weeks, and the two pairs had different gear ratios. The meters on the cars also were changed and calibrated each week and the results compared, so that, while the number of stops was not taken into consideration, it is believed that as a comparison the tests were as accurate as was practically possible. The cars ran on the Frankstown Avenue line in Pittsburgh and upon this line the number of stops is very high.

The average saving in current consumption under these conditions was found to be approximately 12 per cent over the ordinary series-parallel controller. One of the two trucks was geared to do the required work most efficiently, the gear ratio used being better suited to the route than that on the other test truck and in fact better than those on the regular cars on the same run. Table No. 1 shows that if only the large pinions had been used the saving in current through the use of the new controller would have been 13 per cent instead of 12 per cent because of the greater losses with the resistance type of control. However, the summaries of the tests with both gear ratios are given herewith. In addition the same figures are given in the comparison of Table II to show the influence of the gear ratio on power consumption. It will be seen that, with the old type of control with resistance, the saving effected by changing from a 16-tooth pinion to a 15-tooth pinion amounted to 5.4 per cent. With the new type of control the saving effected by the same change in pinions amounted to 2.3 per cent. Under ordinary conditions the cars on the Frankstown Avenue line average 12 stops per mile, the schedule speed being 9.5 m.p.h.

TABLE I—RELATIVE POWER CONSUMPTION WITH DIFFERENT CONTROLLERS

	Passengers	Miles	Passengers per mile run	Watt hours per ton mile	Saving per cent
Gear ratio: 16:57 on both cars.					
Resistance type control.....	48,080	4885	9.85	148.5	...
Control without resistance...	39,607	4471	8.85	128.5	13.5
Gear ratio: 15:58.					
Resistance type of control...	49,381	5290	9.32	140.5	...
Control without resistance...	47,060	4711	9.97	125.5	10.7

TABLE II—INFLUENCE OF GEAR RATIO UPON POWER CONSUMPTION

	Passengers	Miles	Passengers per mile run	Watt hours per ton mile	Saving per cent
Resistance type of control.					
Gear ratio 15:58.....	49,381	5290	9.30	140.5	5.4
Gear ratio 16:57.....	48,080	4885	9.85	148.5	...
Control without resistance.					
Gear ratio 15:58.....	47,060	4711	10.	125.5	2.3
Gear ratio 16:57.....	39,607	4471	8.85	128.5	...

A further set of results was obtained during the month of March, both cars being equipped with a gear ratio of 15:58. During this period the car with resistance type of control carried 29,921 passengers and ran 3264 miles, giving a unit load of 9.15 passengers per mile.

The car with the new control carried 27,613 passengers, and ran 2964 miles, giving a unit load of 9.32 passengers per mile. The power consumption was 130.5 watt-hours per ton mile. These figures show a saving of 10.6 per cent for the new control, almost exactly the same as in the first test.

The new controllers have been in use for approximately a year on seven cars. With the original car thus equipped a mileage of 50,000 has been made since the controller was first installed.

BAVARIAN REPORT ON STEAM VERSUS ELECTRIC OPERATING COSTS

Under date of February, 1914, the Bavarian Ministry of Communications presented to Parliament a report on the electrical exploitations of state water-powers. This report is of special interest from the railroad electrification standpoint inasmuch as it shows the changes which have occurred in the relative costs of operating with steam or electricity. It appears that in 1910 the State was willing to pay a maximum of $2,845,000 for electrical energy to supply the Munich-Garmisch-Partenkirchen and the Munich-Holzkirchen lines. At this time the comparative annual operating costs of the lines affected were as follows: steam, $709,218; eletcricity, $508,578; annual difference in favor of electrical operation, $200,640. These figures covered the handling of 2,201,053 train miles and 426,181,180 metric ton miles with 32,560,000 kw-hr. at a maximum price of 0.77 cent per kw-hr. in the power plant.

The report then goes on to say that, while the 1910 comparison was correct as based on steam costs of the years 1905 and 1906, it was no longer so. Steam locomotives had been greatly improved by the addition of superheaters, while the first cost of the electric locomotives has increased. A comparison under these later conditions showed the following for all lines of the divisions named except the Garmisch-Partenkirchen, Scharniz and Garmisch-Partenkirchen-Griesen lines, which are now in operation: steam, $710,999; electricity, $538,818; annual difference in favor of electricity, $172,-181. These figures cover the handling of 2,306,763 train miles and 447,268,000 metric ton miles with 33,240,000 kw-hr.

The ministry assumes that the electric locomotives would require only 10 per cent reserve compared with 25 per cent for steam. Seventy-five electric locomotives, costing $2,795,000, just for the locomotives, would do the work of 101 steam locomotives, costing $1,659,750. The life of equipment was taken to be as follows: locomotives, whether steam or electric, twenty-five years; overhead-contact system, fifteen years; transmission poles, feeders and insulators, fifty years; transformer stations, twenty-five years.

The reason ascribed for the increased first cost of electric locomotives is chiefly inexperience with the first designs, which were too light for the service in some respects. Of course, the prices might be expected to go down after standard types had been evolved. It was impossible to say when electrification of the Bavarian State Railways as a whole should be recommended, as the data from the present experimental lines were not yet ample enough to form a decision. It would be necessary to wait a reasonable time after transmission, line and locomotive troubles incidental to the early days of operation had been corrected. It was also desirable to wait until further experiences had been gained on the newer electrifications of Innsbruck-Garmisch-Partenkirchen-Reutte and Salzburg-Bad Reichenhall-Berchtesgaden. Each of these lines is 24.8 miles long, and they are well suited for speed tests since they include grades of 3.3 to 4 per cent as well as long level stretches.

The New Standard Grooved Girder Rail Sections

The Author Traces the History of the Development of the Present A. E. R. A. Standard Girder Rail Sections and Discusses Their Applicability in Present Practice—He Suggests the Adoption of Revised Standards in T-Rails

BY MARTIN SCHREIBER, ENGINEER MAINTENANCE OF WAY PUBLIC SERVICE RAILWAY COMPANY

The American Electric Railway Engineering Association performed an important work at its last Atlantic City convention in the final development of four standard girder rails for tangent and curved tracks in paved streets. The need of these rails was recognized for many years. Long before, the steam roads were pioneers in advocating the uniform T-rails, which resulted in the well-known standard designs of the American Society of Civil Engineers. In Great Britain we find even girder rails standardized. Figs. 1 and 2 show one of the British standard rails and its guard. Unfortunately the conditions under which the foreign installations must be made do not coincide with our practice. Only during the last summer the writer had the pleasure of discussing track construction with a gentleman from Glasgow. One of this gentleman's first criticisms of the track construction in America was the large variety of rail sections that he found here.

About three years ago, when the writer was particularly interested in the development of the standard rails for the Engineering Association, he found some 200 different sections actually in use. While it was true that "live" sections were considerably less than this number, still many of the sections in use then were available, and rolls and equipment were yet on hand for the manufacture of many of them. It is only fair to concede that electric railway engineers have fully realized that standard rails would eventually mean better service and cheaper track, but the whole situation had not been altogether in their control. Besides, the development in the electric railway industry, especially of equipment, was not mature, and the time has hardly been ripe for standard rails until now.

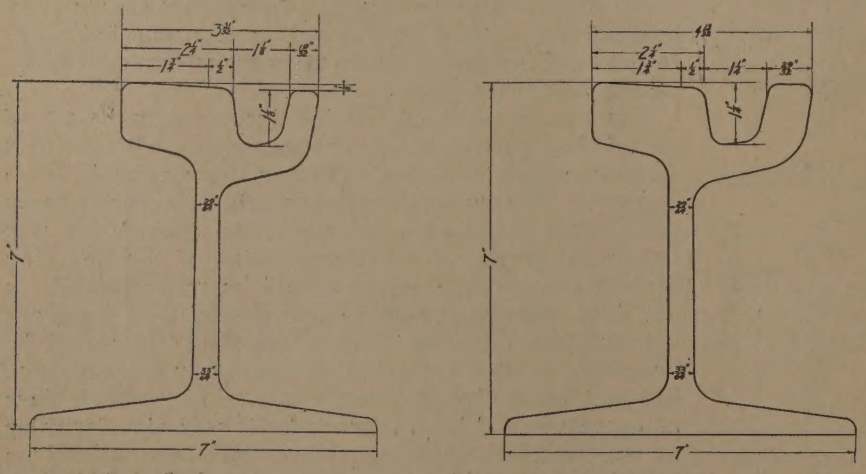
DEVELOPMENT OF THE STANDARD GIRDER RAILS

It may be of interest to trace the development of the standard girder rails that were finally proposed by the Engineering Association. The first actual design of the grooved girder rail for paved streets was that proposed as standard by the committee on rails and rail matters of the American Street & Interurban Railway Association, presented at the 1907 convention. There were two 7-in. and two 9-in. grooved rails, the former weighing 137 lb. and 122 lb. to the yard, respectively, and the latter weighing 122 lb. and 98 lb. to the yard, respectively. In the same report were also recommended two 7-in. and two 9-in. tram rails, together with designs for 7-in. and 9-in. guard rails for use with both grooved and tram sections. Figs. 3, 4, 5 and 6 show in detail the tram and grooved rails for the straight track.

No further progress was made during 1908, but in 1909 the committee on way matters confirmed the report of the 1907 committee, relative to the 7-in. and 9-in. grooved girder sections.

The committee on way matters for 1910 approved the principles outlined in the previous reports, but submitted in detail for consideration the designs for 7-in. and 9-in. grooved girder rails, shown by Figs. 7 and 8. The reasons for submitting alternative designs were that the committee considered the previous sections to be too heavy and their first cost too high.

In 1911 the same committee revised the work of all preceding committees and confined its attention to the design of a 9-in. grooved girder rail, as shown in Fig. 9, submitting a thorough and careful analysis of the principles which governed each detail. The design submitted by this committee comprised one radical departure from any other rail section that had previously been in use or proposed, in that it provided for a tapered web. The reason given by the committee for the change in design was a mathematical one. It was explained that in the case of wagon loads on the tram or when cars sway from side to side, the web acts as a cantilever, and its stability is directly proportional to the cube of the cross-section at the base. The web provided in the 9-in. rail submitted by the committee, therefore, had about two and one-half times the stability of the straight web 9/16-in. thick, although containing practically the same quantity of metal as the rail with the uniform web. The committee of 1911 was very anxious that the 9-in. girder rail, that it proposed, should be adopted as standard, but the convention decided that it would be better to prepare designs for both the 7-in. and 9-in. rails for straight track and 7-in. and 9-in. rails for curved track, rather



Figs. 1 and 2—British Standard Rail Section No. 5 and Its Guard; L. S. Sec. 110-413 and 116-414

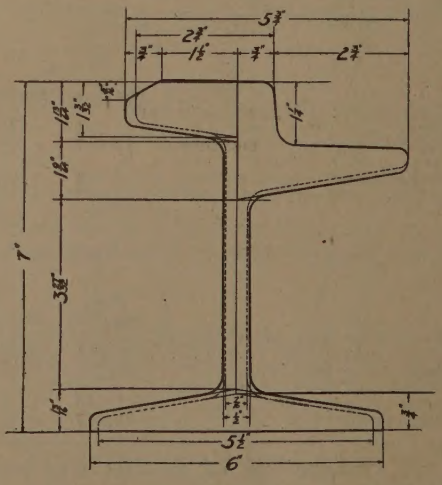


Fig. 3—7-In. Tram Rails Recommended in 1907; Weights 122 Lb. and 96.4 Lb.

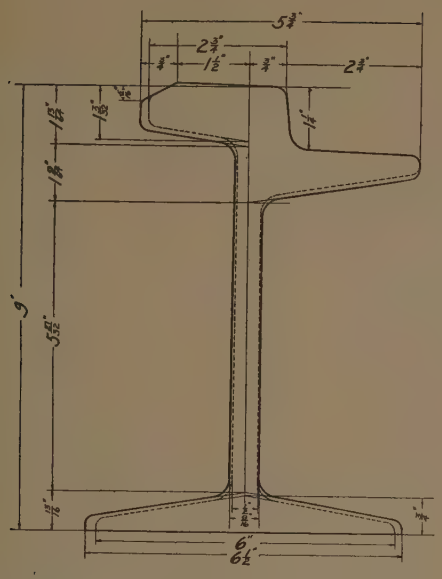


Fig. 4—9-In. Tram Rails, Recommended in 1907; Weights, 137 Lb. and 120.3 Lb.

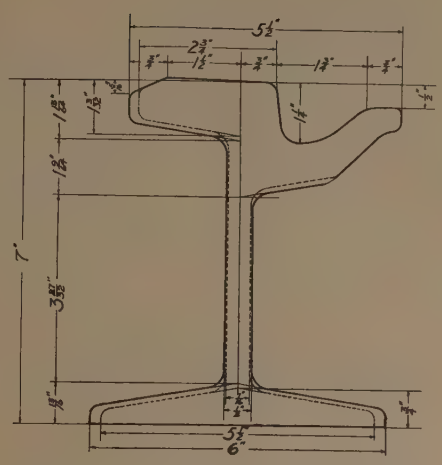


Fig. 5—7-In. Grooved Rails, Recommended in 1907; Weights, 122 Lb. and 98 Lb.

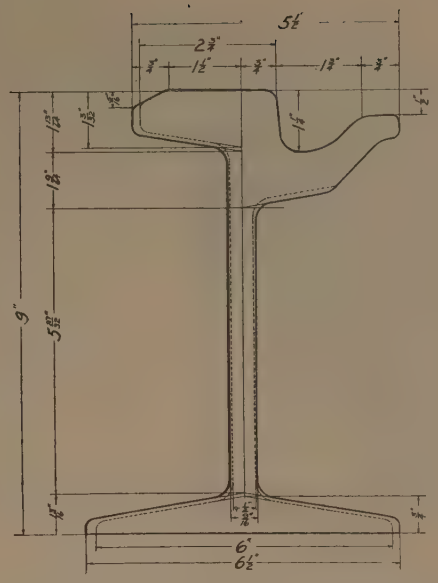


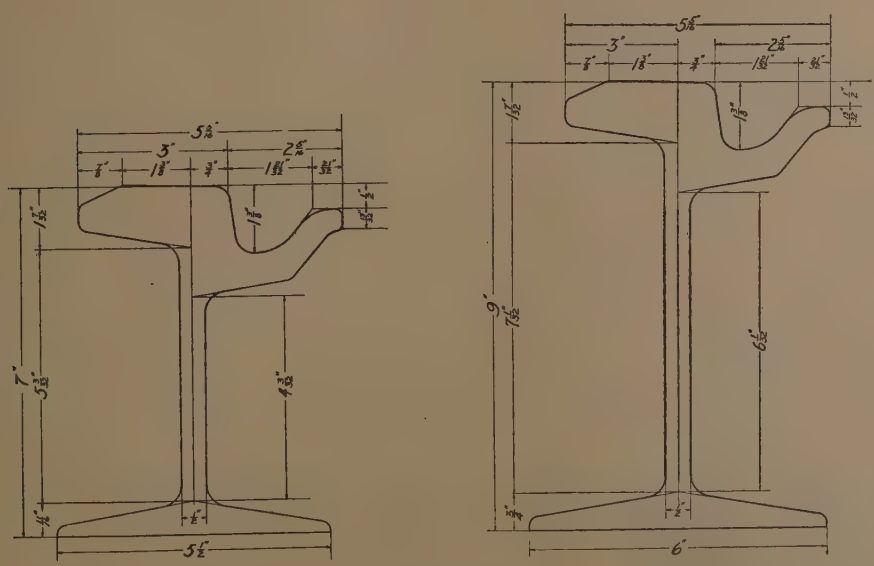
Fig. 6—9-In. Grooved Rails, Recommended in 1907; Weights, 137 Lb. and 122 Lb.

than a design for one rail only. Accordingly, the committee on way matters for 1912 approved the 9-in. design submitted by the 1911 committee and also presented three additional designs covering a 7-in. grooved rail for straight track and a 7-in. and a 9-in. guard rail for curved track. Although these four designs appeared to be very nearly what was required, the committee on standards did not approve the recommendations of the way committee, principally on account of the contour of the throat of the guard rail and referred the whole question back for further action of the way committee reporting to the 1913 convention. Fig. 10 shows the design of the 7-in. grooved rail with tapered web that was included in the 1912 committee's report.

The 1913 committee on way matters, with the experience of all previous committees and the large number of discussions that had occurred in committee meetings and on the convention floors, was determined to produce satisfactory designs. Accordingly, it submitted at the 1913 convention plans for four standard rails, including those for straight and curved track, both 7-in. and 9-in. These designs were not only approved by the committee on standards, but the action was also ratified by the convention and the rails now the standard for the association are as shown in Figs. 11, 12, 13 and 14.

THE COMMITTEES' OLD AND NEW DESIGNS

Thus, after six years of continuous work by the way committees, we have four standard rails. It is interesting at this time to compare the original rails, as produced by the 1907 committee, with the rails recommended by the committee of 1913. If we compare only the weights of the rails we find that there is very little difference, and the layman may wonder why the committees were so long in arriving at the final decisions. Closer examination, however, develops the fact that a great deal has been accomplished. In the first place, in 1907 sixteen rail sections were proposed as standard, in 1913 only four. This is due to the fact that the 1913 committee felt justified in eliminating the tram rail altogether, and also that it proposed only one 7-in. and one 9-in. rail, instead of two of each. Most engineers will now admit the wisdom of the action of the 1913 committee. At any location where a tram rail would be allowed by the municipal authorities, it seemed that a T-rail would be just as efficient from the latter's point of



Figs. 7 and 8—7-in., 106-lb. Grooved Rail and 9-in., 120-lb. Grooved Rail, Recommended as Standard in 1910

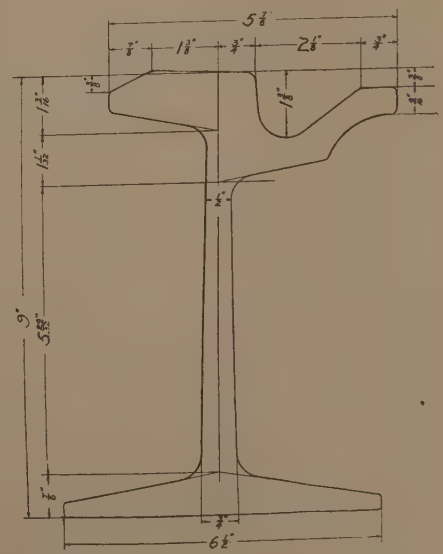


Fig. 9—9-In., 136-Lb. Grooved Rail, Recommended in 1911

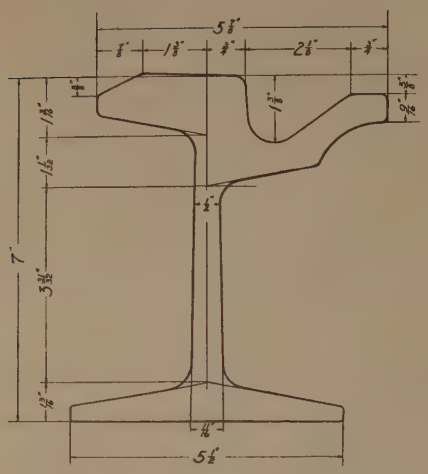
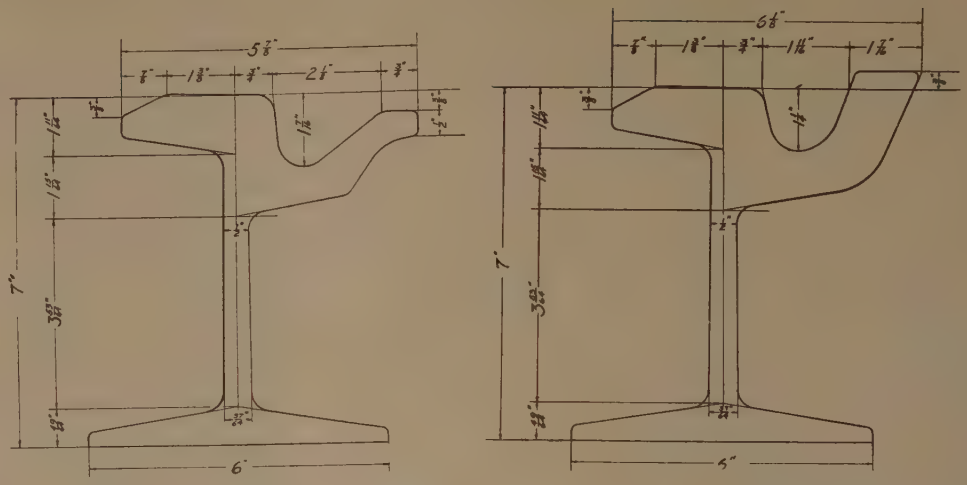


Fig. 10—7-In. Grooved Rail Recommended as Standard in 1912



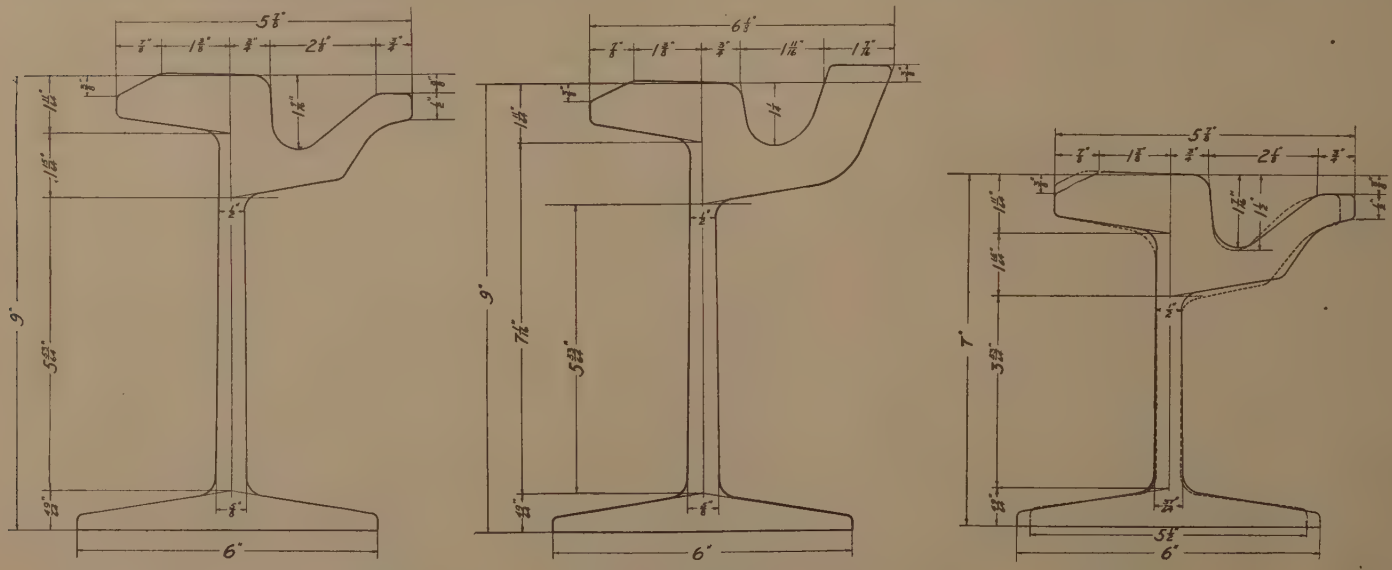
Figs. 11 and 12—7-in., 122-lb. Grooved Rail and Its 140-lb. Guard Rail, Recommended as Standard in 1913

view, and certainly largely preferred to any other type of rail from the railway company's standpoint. If the T-rail is not approved it seems that there is not any reasonable alternative but the grooved girder rail.

When the 1907 committee made its recommendations, there was considerable question about the tendency of modern equipment, especially as to the weight of cars, and the committee was entirely justified in recommending these types of rails. The 1913 committee, however, had the advantage of seeing the problem of equipment further developed, and it is fortunate that it was able to recommend to the association a single 7-in. and a single 9-in. rail to cover average conditions. Every engineer appreciates that the smaller the number of standard sections from which it is possible to select, the better it is, not only for the railway company but also for the manufacturer of the material, because it means improved and cheaper product and better delivery.

As stated above, for example, one of the 9-in. grooved rails of 1907 weighed 137 lb. and the 9-in. grooved rail of 1913 weighed 134 lb., a difference of only 3 lb. There are, however, material differences in design. The contour of the head is modified, in that the width of the wearing surface of the later rail is 2⅛ in. as against 2¼ in. in the old rail. The depth of the bevel, also, of the new design is 1/16 in. greater than in the 1907 rail, and the length of the bevel is ⅛ in. greater. The advantages of these changes accrue principally to railway properties that are still using a narrow tread of wheel in that they allow longer life of the rail before ridges appear on the wearing surfaces. The over-all width of the head of the 1913 rail is ⅜ in. greater than that of 1907, and the depth of the lip below the head is ⅛ in. less. These latter changes were made to afford better paving and vehicular conditions.

Another important improvement in the 1913 rail is the increase in depth of the groove from 1¼ in. to 1 7/16 in. This point was very difficult to decide, on account of the early practice providing a depth of only 1⅛ in., and some of the rail rolled during the last few years has a depth of 1½ in. It is very desirable to have the groove deep to give maximum wearing value to the head; nevertheless, it has been thought undesirable by many because of vehicular traffic and of the cutting down of the fishing depth, especially in the case of the 7-in. rail. The design of the web of the new rail is entirely different from that of the old in that the taper of the 9-in. rail is ½ in. at the top and ⅝ in. at the bottom. This arrangement, as explained, increases the stability, tending to prevent corrugation which has been a serious menace particularly in the last few years. It will be noticed that the width of the base of the heavy 1907 9-in. rail was 6½ in., while that of the rail proposed by the 1913 committee is only 6 in. In the committee's opinion, it was only necessary



Figs. 13 and 14—9-in., 134-lb. Grooved Rail and Its 152-lb. Guard Rail, Recommended as Standard in 1913

Fig. 15—Standard 7-In. Grooved Rail and L. S. Sec. 116-434

to design a base that would be of sufficient width for bearing, and at the same time the narrow base allowed more uniform rolling.

Generally, the same arguments apply to grooved guard rails, but in the latter, there is a distinct tendency toward a change of contour and an increase in the width of the throat. Of course the design of the throat of the guard is altogether a question of construction of the equipment. The equipment has been considerably developed since the 1907 committee's deliberations were presented. In fact it is now generally conceded that it is necessary to provide a guard that will take care of a standard A. E. R. E. A. flange and a wheel-base varying from 4 ft. to 6 ft., with radius of curved track varying from 40 ft. upward. The fact that the throat in the guard rail has been designed only 1¼ in. deep seemed to be an advantage because the wear on the guard is not apt to come on the bottom of the groove but rather on the sides, and the decrease of the groove allows an increase in the depth of the guard, which is desirable on account of the large strain on the guard by the wheels of cars taking curves.

The committee of 1913 is also to be congratulated because an honest effort was made to create rails that would, so far as possible, not only conform to the principles that were required to be met but also fish with existing rails. For example, the 9-in. grooved rail fishes with Pennsylvania Steel Company's sections No. 125-273 and No. 151-283 and Lorain Steel Company's sections No. 125-423, No. 132-440 and No. 150-441. It is at once apparent that it is much easier for any railway company to adopt standard rails if no changes are required in the joints.

MODERN RAILS IN USE

It is worth while to examine the practice in representative American cities of rails in use at the present time. Characteristic practice is shown by the rail sections used in the following cities as given by the section numbers. These are, Brooklyn, No. 105-453; New York, Nos. 110-404 and 122-428; Philadelphia, No. 141-395; Boston, Nos. 132-440 and 151-462; Chicago, No. 129-403; San Francisco, No. 106-422; Pittsburgh, Nos. 132-440 and 116-434; Cleveland, No. 95-400; Newark, No. 116-434, and Louisville, Nos. 125-460 and 103-426. The section numbers referred to above are the Lorain Steel Company, and the Pennsylvania Steel Company has corresponding rails.

Although the extraordinary conditions and requirements in some locations may require for a time at least the use of special rail sections, as for example, slot rail or other special construction required by ordinance, still the new standard rail of the association may very easily be substituted in a large number of instances. It is a fact that the present rails all conform to the new design, as shown by the tendency of the designs to offset the gage line from the center of the web, thereby causing the rail to be better balanced when under the influence of the wheel load. The application of the principle of increasing the thickness of web and depth of groove is also apparent. Indeed, we find rail recently used in Pittsburgh and Boston that will actually fish with the new 9-in. section recommended by the Engineering Association. Fig. 15 shows the present rail sections of the Public Service Railway as compared with that of the new standard 7-in. grooved girder rail. These latter rails correspond very closely, and it was unfortunate that the committees were not able to arrange the design of the new rail to fish with this section, as it is extensively used by a number of companies.

From the foregoing it is seen that the committees have worked very close to the prevailing tendency of present practice in designing the new sections, and the work is commendable in every way. It is true that any section whatever which might be advocated is subject to criticism, but no one can question the soundness of the broad principles underlying the design of the new rails, as these principles are practically ratified by most experienced electric railway engineers. The manufacturers of rails have been just as keen to produce a standard as have the railway companies, and they deserve a great deal of credit for their hearty co-operation in all of the committee's deliberations. It is also fortunate that almost simultaneously with the introduction of approved design of rails we have the new standard specifications for open-hearth rail, which have been ratified by the American Electric Railway Engineering Association and also by the American Society for Testing Materials.

It may be said, therefore, that the electric railway industry is in a better position to-day to know what is actually required in the way of grooved girder rails than ever before. The future will see a further reduction in the number of rail sections through a more general use of the 7-in. rail, eliminating the 9-in. rail to a large degree. Primarily the demand for 9-in. rail was caused by the use of deep paving blocks and mechanical joints. Both of the latter are rapidly disappearing in modern practice, and there is no good reason why the 7-in. rail with welded joints and with shallower paving will not answer as well as the 9-in. rail. And it certainly has less first cost.

The fact that the energies of the way committees have been devoted to producing the standard grooved girder rail sections, probably caused some oversight in revising the designs of the standard T-rails of the association. The present is the proper time to revise these standards. Probably one weight of high T-rail will be sufficient, and it is to be hoped that this standard rail will be of some now standard section. So far as the low T-rail is concerned, the association seems to have acted properly in following the standard of the steam roads.

FOLDING STEPS FOR KANSAS CITY RAILWAY

Folding steps have been installed on many cars operated by the Metropolitan Street Railway, Kansas City, Mo., and the installation will be made general as rapidly as the mechanical department can make the necessary changes. The folding steps will be used, at least temporarily, only on the front doors, which are used for exits and entrances. The folding step operates in connection with the door. A feature of the new steps is a delay mechanism, whereby the step drops into place before the door opens to an appreciable extent. If the step fails to work, the door cannot open, as the operations are interlocking. It is believed that this phase of the installation will prevent accidents, many of which are reported to have occurred where the door opens and the step fails to drop. The grab-handles are inside the door, thus discouraging passengers from attempting to board a car when the front door has been closed and it is ready to start.

According to the *Near East* the Périer concession for tramways in Jerusalem includes the following terms: work to be completed within two years; concession to last forty years. The municipality is to receive 30 per cent of the net profits of the railway and lighting services, of which two-thirds will be used for the benefit of Jerusalem and one-third for the benefit of the district. Branches of tramway lines to different parts of the city, as well as to Bethlehem, will be constructed. There will be four separate lines, all starting from the Jaffa Gate, one of them going out to Bethlehem. The concessionaires also have the right of water supply and electric lighting.

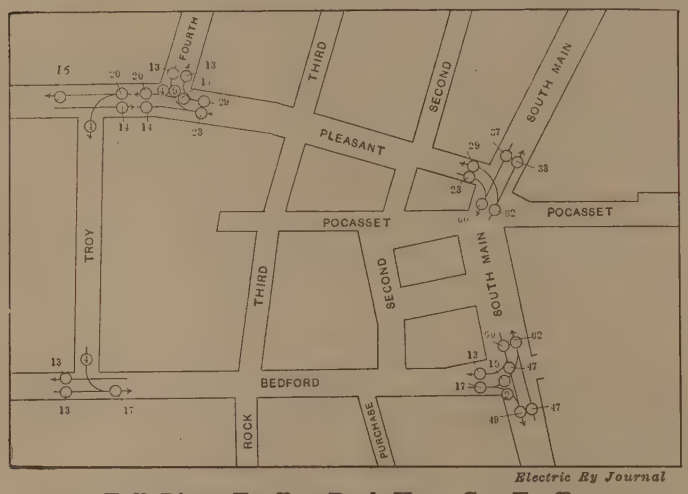
Report on Traffic Congestion in Fall River, Mass.

Abstract of an Investigation by D. C. & Wm. B. Jackson of the Factors Limiting Street Railway Service in the Center of a Representative New England Textile Manufacturing City

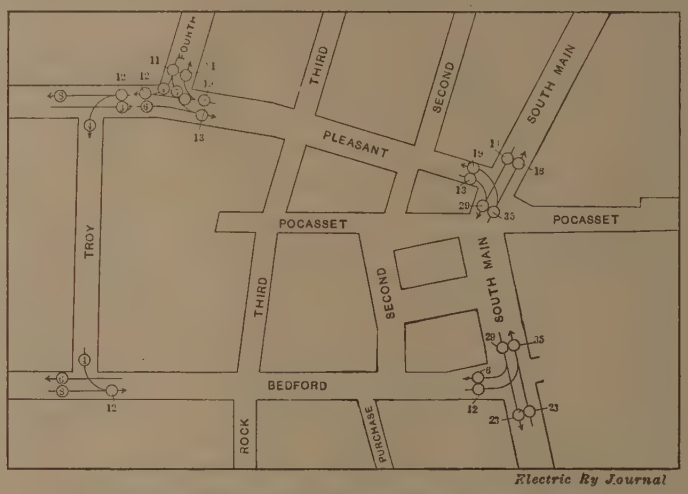
At the request of the Fall River (Mass.) Chamber of Commerce, the engineering firm of D. C. & Wm. B. Jackson, Chicago and Boston, has investigated the problem of street railway traffic congestion in the heart of that city. As a result it has filed an exhaustive report analyzing the conditions bearing upon this phase of the service, with recommendations for certain improvements in track arrangement, traffic regulations, handling of cars and re-routing. The adequacy of the service was not investigated, as the authors were directed to devote practically their entire attention to the problem of reducing congestion. An abstract of the report follows.

LAYOUT OF FALL RIVER AND CHARACTER OF TRAFFIC

The city of Fall River, situated at the mouth of the Taunton River on Mount Hope Bay, lies on land of rugged topography, and its streets are crooked and narrow. It is an important center of cotton manufacturing and had a population of 119,295 people in 1910.



Fall River Traffic—Rush-Hour Car Traffic



Fall River Traffic—Normal-Hour Car Traffic

The Bay State Street Railway operates the local car service, and in the fiscal year 1913 carried 106 times the full population of the municipality within the city limits. It is estimated that the population in 1920 will be 140,000.

The city rises somewhat abruptly from the shore of the bay, and the City Hall district, which is in a valley-like depression between the sections of the city north and south and lying between the wharves and the location of the mills to the eastward, early became and has remained the commercial heart of the town. The city is radial in character from the City Hall outward, but the City Hall is not at the center of gravity of street railway traffic. Main Street, between Pleasant and Bedford Streets, affords the only satisfactory route for a street railway connection between the northern and southern portions. This condition, together with the narrow streets, heavy vehicular traffic and the absence of rigid traffic regulations, has caused objectionable congestion in the City Hall district.

A heavy vehicular traffic occurs along Central and Pocasset Streets to and from the waterfront, and because of favorable grades these streets are destined to continue to play a vital part in the cross-town handling of heavy mill products and merchandise. The highest number of vehicular movements at the Central and Pocasset Street crossings of Main Street in a fifteen-minute period are at the rate of from six to seven per minute, and at the ends of Third Street there are five vehicles per minute, with a smaller movement at Second Street. Fortunately, the maximum vehicular movement does not coincide with the street car maximum. The former occurs between 10 and 11 a. m. and the latter between 5 and 6 p. m. The maximum car movements on Dec. 1, 1913, at South Main and Pleasant Streets were at the rate of 160 cars per hour between 5:45 p. m. and 6 p. m., and at North Main and Bedford Streets the maximum was at the rate of 130 cars per hour between 5 p. m. and 5:15 p. m.

A comparison of the density of teaming and street car traffic in the maximum hour on important streets in the City Hall district shows that Main Street, between Pleasant and Bedford Streets, cannot escape congestion unless vehicles and cars are kept moving. This tendency to congestion is exaggerated by switching and trolley turning of twelve to fifteen cars in the busy hour immediately in front of the City Hall, by the same operation for five or six cars opposite Granite Street, by switching and turning east of the Pleasant Street neck, and by the blocking of both north-bound and south-bound tracks because of the use of cross-overs by cars entering Bank Street and Franklin Street. The heavy afternoon vehicular traffic overlaps the street railway rush-hour traffic slightly but dies down rapidly after 5 o'clock. The street railway traffic is heavier on Saturday afternoons and summer Sundays than on week-days, but teaming traffic is then little or nothing.

EFFECT OF AUTO-TRUCK SERVICE

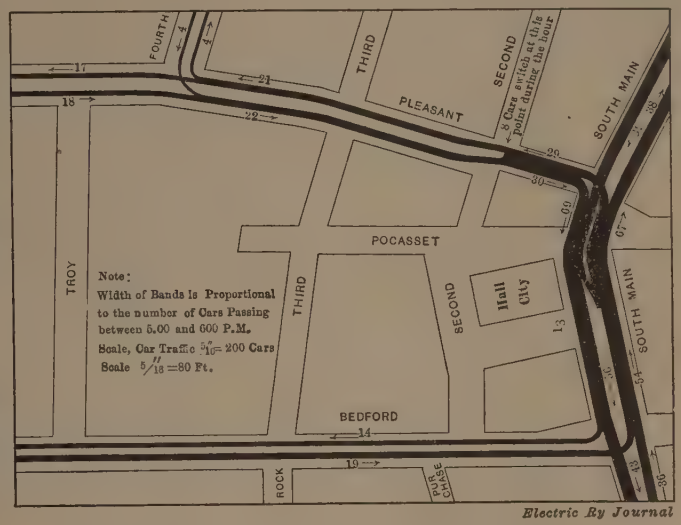
Relatively few auto trucks are as yet in use in Fall River, but the expectation is that the number will materially increase. Motor vehicles alone and moving cause little congestion, but such traffic requires wider spacing in the streets for safety. The special committee on bituminous materials for road construction of the American Society of Civil Engineers has just reported in favor of a unit width of traffic lines of 9 ft. or 10 ft., instead of 7 ft. or 8 ft., on account of the greater clearance required by motor trucks. The maximum normal width of vehicles in Fall River is 7 ft., and the maximum width of open cars in the city is 9 ft. There is no compelling reason why the loading and

transfer point in front of the City Hall should not be continued for all the existing street railway routes, provided proper vehicular traffic regulations are introduced and provided street cars are kept circulating. Except for the blocking of the tracks by unnecessary delays and car stoppages, many more cars could be operated through this district without causing serious congestion. The greatest congestion arises because wagons and automobiles are allowed to occupy for indefinite periods the space along the curb which should be used for through vehicular traffic. Somewhat the same conditions exist in other streets. A parking space for vehicles off the main streets is needed.

AMOUNT OF CAR SERVICE

Fall River has perhaps an abnormal amount of single track for a city of its size, owing to the narrowness and crookedness of its streets. It appears impracticable

Fall River Traffic—Vehicular Traffic



Fall River Traffic—Street-Car Traffic

greatly to increase the amount of double track. The Bay State company has for urban winter operation at present thirty-three single-truck, closed passenger cars seating from twenty-eight to thirty persons each and thirty-four double-truck closed cars seating from thirty-six to forty-eight each. On Dec. 1, 1913, sixty of these cars were being operated in the rush hour between 5 p. m. and 6 p. m. on the urban routes. During the summer the company can put into service seventy single-truck and eighteen double-truck open cars and twenty-four single-truck and twenty-two double-truck closed cars, making a total of 134 cars available.

The number of cars proper to be operated upon the various routes within a city depends primarily upon the traffic offered on the routes, and in a radial city like Fall River the central district becomes a common transfer point. The operating schedules directly affect the problem of congestion in the central district, but limitations of facilities in handling cars should not be allowed to determine the number of cars operated on various routes, since the latter should be determined by the requirements of the traveling public. The scheduled trip speeds lie near 8 m.p.h. in Fall River, which is a satisfactory figure for the local streets. The company's car schedules appear reasonably satisfactory.

The serious car congestion now arising is determined by the number of cars in the rush hour and the manner of their handling. The actual car movements in the rush hour are larger than the company's schedules of regular and tripper cars indicate, owing to additional switching and to express-car and work-car movements and to the fact that delays of the schedule chance to bring certain additional cars into the congested area during this rush period. All the cars of the local service and the interurban cars come into the City Hall block, and the regular scheduled urban cars entering from the south considerably overbalance those from the north. This causes much switching of cars in the City Hall district, and consequent delays. Further congestion is due to opposing movements on single-track lines and to lay-overs of the Taunton interurban and railway depot cars. Again, trippers from the Stafford Road carhouse are switched at crowded points.

Two carhouses are operated, one at North Main and Old Colony Streets, 0.75 mile north of the City Hall, and the other at Stafford Road and Albert Street, 1.5 miles southeast of the City Hall. More than 90 per cent of the cars are operated from the Stafford Road carhouse. The express terminal is operated by an interurban company at Bedford and Sixth Streets, about 0.2 mile eastward from the City Hall. Six of the night trippers come from the Main Street carhouse and twenty-five from the Stafford Road house, twenty-three of the latter causing much congestion on South Main Street by being routed over the single-track line on Rodman Street.

RELIEF METHODS PROPOSED

Four principal methods of relieving congestion have been considered:

(1) By routing the cars so that those entering the City Hall district from one direction will leave it in another direction without reversing. This plan of through-routing is already in effect for the greater portion of the regular local cars, and careful studies indicate that sufficient further through-routing cannot be done to eliminate the congestion.

(2) By the construction of loop tracks over which cars not through-routed may be operated when passing through the congested district.

(3) By reversing trolleys and switching cars beyond the congested district, instead of within that district as is now the practice with many of the cars.

(4) Main-stem operation, with cars passing up and down Main Street, with cars on the cross streets stopping and transferring between cars on the main stem and then returning on their routes.

All of these methods have been used in different cities. The first is extensively used in Fall River, and the second will ultimately become essential as the city grows. Associated with it should go the widening of Third Street and probably the extension of High through to Troy Street, affording traffic and street car outlets in that direction, and other improvements beyond the scope of the present investigation. The third plan may

be introduced at present to relieve existing conditions, and if it is associated with a loop on Troy or Third Street, over which only a limited number of cars shall be operated, this solution will be very satisfactory for a period of years; but the final solution will rest with further looping of the cars, since an extension of the business district will ultimately make the shuttle switching required by this method an inconvenience. The fourth method is inadvisable in a city like Fall River on account of the inconvenience imposed upon passengers by largely increasing the transfer traffic, and also because of the inconvenience and danger which would arise from blocking up the ends of important side streets by standing cars.

Some through-routing might be done with interurban cars, but the service would tend to become unbalanced, and if certain local cars were through-routed it would involve disadvantages to schedules now adjusted to the satisfaction of the public. An arbitrary change of street car schedules for the purpose of through-routing is likely to cause more inconvenience than advantage. The cars serving the railroad station cannot be satisfactorily through-routed, chiefly because their running times are adjusted to train arrivals. Wherever the schedules can be arranged rationally and normally for through-routing, it ought to be accomplished now and in future, but the existing requirements of passengers do not call for a sufficient change of frequency of service on various streets to be of material value in improving through-route arrangements, and the company has done about all the through-routing practicable as an aid to avoiding congestion in the central district.

RECOMMENDATIONS

The Pleasant Street neck should be double-tracked at once, the street being widened at such time as the city's finances permit. The branch-off curves to and from Main Street should be improved by shifting the tracks in the latter thoroughfare slightly to the west.

The Bank Street entry from Main Street should be improved by installing a double branch-off into the single track on Bank Street, with an electric track switch for the north-bound track in Main Street. The same thing should be done in Franklin Street, and if exact surveys show it to be possible, a turn-out is desirable in each of these streets near Main Street; otherwise automatic track switches should be installed and the arrangement of the electric signals improved.

The switching of cars and shifting of trolleys in front of the City Hall or elsewhere on Main Street between Franklin and Rodman Streets, and on Pleasant Street, should be prohibited except in extreme emergencies.

The company should not permit cars to lie over in the streets awaiting departure, and if interurban lay-overs are necessary, a terminal should be provided.

To handle cars not through-routed, cars from Pleasant Street (except Rodman Street) and South Main Street not through-routed should switch at a new crossover on North Main Street between Pine and Cherry Streets (or at the terminal of the Bank Street single track), and cars not through-routed coming from North Main Street should switch on Fourth Street, between Pleasant and Hartwell.

It is desirable to authorize the laying of a track on Troy Street, for loop service, but to limit rigorously the traffic to eight cars per hour in the rush-hour period until traffic provisions can be made to prevent the standing of vehicles in Bedford Street between Third and Main. This will afford a relief passage for rectifying the car schedule in the event of an interruption for which shuttle switching might cause too much delay. Third Street should be widened, thereby becoming a logical street for a loop-track service.

The need of electric switches at the Bank and Franklin Street branch-offs has been discussed. They should be installed at the entries from Main into Pleasant and Bedford Streets, unless the company continues to maintain switchmen at these points.

A track should be laid in Globe Street, from Stafford Road to East Main Street, to facilitate handling cars to and from the Stafford Road carhouse, now dependent on a single-track entry into the heart of the city.

A track on Morgan Street, connecting Fourth and South Main Streets, is desirable for the use of outbound cars. The entrance to a local schoolyard should be moved to another street.

The standing of vehicles should be prohibited in Main Street between Anawan and Granite Streets (except on the west side of South Main between Anawan and Pocasset) as well as the Pleasant Street neck. A twenty-minute or thirty-minute standing limit appears reasonable on Bedford Street between Main and Third.

Any vehicle should be prohibited from stopping or standing on a crosswalk or in such a position near a street corner that its nearest point is less than 10 ft. from the curb of an intersecting street. It will be necessary for the city to give attention to the width of vehicles and the conditions of their loadings unless some of the streets are widened.

The accompanying drawings show the traffic in the City Hall district resulting from the carrying out of the foregoing plans, both for ordinary and rush hours. In the diagrams on page 816 the numbers placed near the small circles indicate the numbers of cars passing the corresponding points, per hour, in the directions indicated by the arrows.

But little additional burden is put on Bedford Street, and a satisfactory terminal is provided for every car route not through-routed. The switching space on Fourth Street between Pleasant and Hartwell Streets is wide and little burdened with traffic. It is proposed to limit the cars which switch here to seven per hour, and the arrangement can be utilized for several years without inconvenience. As the city grows streets must be cut through to provide additional through routes for all kinds of traffic.

ELECTRIC CONDUCTIVITY OF EXHAUST GASES FROM STEAM LOCOMOTIVES

The results of investigations of the electrical conductivity of the exhaust from steam locomotive stacks have recently been published showing why discharges from high-voltage trolley wires to steam locomotive stacks can occur through distances much less than usual when gases and vapor are escaping from the latter. Experiments show that the greater conductivity under these conditions is due to the ionization occurring in the space between the wire and the track produced by the friction of the escaping gases and moisture. Experiments were made with a locomotive under a wire and with its blower closed, half open and wide open. The break-down voltages between wire and stack were compared with those required to break down the same length of air path with the locomotive removed. On the average it required about one-half the voltage to break down the air with the locomotive present.

A. L. Rohrer, lectrical superintendnt, and J. J. Linebaugh, of the General Electric Company, gave on April 1 before the Ohio State University branch of the American Institute of Electrical Engineers a lantern slide and moving picture lecture of the electrification of the Butte, Anaconda & Pacific Railroad. The moving pictures showed the difficulties overcome by the engineers.

ELECTRIC TRACTION ON LOOKOUT MOUNTAIN

BY E. D. REED, GENERAL SUPERINTENDENT CHATTANOOGA RAILWAY & LIGHT COMPANY

For years the only way by which the top of famous Lookout Mountain could be reached, other than by wagon road or footpath, was by the line operated by the Lookout Incline Railway Company. About twenty-five years ago a corporation known as the Chattanooga & Lookout Mountain Railway Company built a single-track steam railway line from St. Elmo for a distance of about 8 miles to the summit of the mountain. After a few years this railway was abandoned and the tracks were removed.

Early in 1913 the Lookout Mountain Railway Company, which had acquired the right-of-way of the old company, began the construction of an overhead trolley line over virtually the same route. This new line has recently been completed and put in operation. It is in addition to the old incline, which is still in use to carry tourists and residents to and from the summit of the mountain.

The new line forms part of the system of the Chattanooga Railway & Light Company, which is operated by E. W. Clark & Company.

Lookout Mountain—View Looking Down Incline Taken from Point Near Head of Incline

TRACK AND LINE

Beginning at St. Elmo, the new line branches from the tracks of the Chattanooga Railway & Light Company and by a cut of 800 ft. reaches the old location of the steam road. By a circuitous route along the slopes of the mountain, at a grade of only 3½ per cent, it reaches the summit. The new line is laid with 70-lb. A. S. C. E. T-rails on oak ties, 6 in. x 8 in. x 8 ft., and ballasted with crushed limestone. The rails are equipped with continuous joints and are bonded with No. 0000 protected bonds 13 in. long. High-speed split switches and spring frogs are installed at the four turnouts.

The overhead construction is of the bracket suspension type, the poles being spaced about 100 ft. apart. Two-inch pipe brackets are attached to each pole, and these in turn support two No. 00 grooved trolley wires. This method does away with the need for overhead switches at the turnouts, and at the same time gives additional feeder capacity.

The cars are 42 ft. 9 in. long and have 28-ft. bodies. They are mounted on double trucks equipped with four motors of 50 hp each. Motor control of the Westinghouse H.L. type allows the operation of six cars per train. The cars are equipped with National air brakes and are designed for moderately high speed. Current at 600 volts is obtained from the Chattanooga Railway & Light Company and is used by both the electric railway and the incline.

For nearly 8 miles the new line winds its way up the rugged sides of Lookout Mountain, affording views of surpassing and impressive beauty. The entire valley below stretches out for the admiring gaze of passen-

Lookout Mountain—Crossing of Electric and Incline Railways

gers. The winding character of the route gives probably the most varied and comprehensive views of Chattanooga, the Tennessee River, Walden's Ridge and the surrounding country.

INCLINED RAILWAY

The inclined railway has its lower terminus at St. Elmo and operates for a distance of 4750 ft., a line running to the top of the mountain. The difference in elevation between St. Elmo and the Lookout Mountain station, at the summit of the mountain, is approximately 1500 ft. The average gradient is about 35 per cent, reaching a maximum near the head of 67 per cent.

This railway is built with 56-lb T-rails laid on 6-in. x 8-in. x 8-ft. ties and is standard gage throughout. A turnout is located half way between stations, and between this turnout and the head of the incline three rails are used instead of two independent double tracks.

By an ingenious arrangement of the switches of the turnout and by having inside wheel flanges on one car and outside wheel flanges on the other, it is possible to

Lookout Mountain—A Typical Rock Cut on the New Right-of-Way

dispense with any movable parts at the turnout switches. A large part of the line, particularly at the upper end, runs over substantial wooden trestles.

The two cars operated on this railway are built at an angle to fit the average grade. These cars are 31 ft. 1¾ in. in length and have a capacity of forty-five passengers each. They are large and comfortable, with electric lighting and heating and have observation platforms on the lower ends. The cars are hoisted to the top of the mountain by a modern electric-driven hoist with two motors of 130 hp each. They are operated at 600 volts each, driving winding drums over which two 1¼-in. steel cables are wound. At different points, 30 ft. apart, along the incline are small sheaves on which the cable travels as the car ascends and descends the mountain.

It is impossible to hoist a car past a given point at the head of the incline, as the current is shut off gradually by a set of electric switches which are tripped as the car enters the station. Each car is equipped with an Otis double-grip safety device, capable of holding 50,000 lb. This device is automatically operated by a centrifugal governor which applies the safety device should an excessive speed be reached. It is also provided with a hand-operated mechanism which can be operated by the conductor on the car. This grip engages in a 6-in. x 8-in. yellow-pine stringer bolted to the outside of the track for the full length of the incline. A safety brake on the main winding drum, operated either automatically or by the engineer at the power house, will also stop the car in emergencies.

ARLES-SUR-TECH - PRATS DE MOLLO SINGLE-PHASE RAILWAY

Early in August, 1913, a 6000-volt, twenty-five-cycle single-phase railway was completed for operation between the cities of Arles-sur-Tech, Prats de Mollo and Saint-Laurent de Cerdans. These towns are in the eastern Pyrenees adjacent to the Spanish border. The road is operated by the Midi Railway, which owns the electrical and mechanical equipment, but the right-of-way and fixed structures are the property of the Department of the Eastern Pyrenees. The new lines enjoy a large tourist traffic, but they were built primarily to improve freight and passenger intercourse between the towns named. The system is divided into two lines, one 20.7 km (12.8 miles) and the other 18.7 km (11.6 miles) long. The track is of meter gage, and a large part of it is built on the public highway. The rails weigh 40 lb. per yard. The maximum grade is 5 per cent, and the smallest curve has a radius of 25 meters (82 ft.).

The daily service in each direction consists of three trains which make connection with the standard gage main line of the Midi Railway at Arles-sur-Tech. All trains handle passengers and freight. A train usually consists of a 28-ton motor car and enough trailers to make a weight of 50 metric tons empty. The maximum train weight is 70 tons. The speed is limited to 26 km an hour (16.1 m.p.h.).

The contact line receives 6000-volt, twenty-five-cycle energy direct from a water-power plant which contains three 200-kva to 300-kva generators. The plant is located at Piug Redon, which is almost at the center of the line. The feeders are of aluminum, 93 mm² (about No. 000), in section (and their greatest length is 10 km (6.2 miles). The return circuit is made through the rails and through an aluminum cable of the same section as the positive feeders.

The catenary line is carried on kyanized wooden poles spaced 40 m. (132.2 ft.). The catenary is of single suspension type, consisting of a steel cable of 20 mm² (about No. 4) section and a copper trolley of 50 mm² (about No. 0) section. The hangers are of steel and are suspended at intervals of 3 m (9.8 ft.). Double insulation is used throughout.

Each of the four motor cars is of center-entrance type. It seats seven first-class passengers, seventeen second-class passengers and also has room for four passengers in each operating cab. The cars are 11.4 m (37.4 ft.) long over the bumpers and are mounted on double trucks, 5.2 m (17 ft.) between centers. Lubricators are carried on the trucks owing to the great amount of curvature. Each car has four six-pole motors of the Latour series repulsion type, having an hourly rating of 50 hp each at 300 volts, twenty-five cycles. The ear ratio is 18:85. Each motor is provided with a self-induction coil which limits the speed of the car to 16.1 m.p.h. An 0.6 hp 45-volt blower motor provides artificial ventilation for the motors when they are used for electric braking. Westinghouse automatic air brakes are also installed.

The motors are supplied by two single-phase oil-insulated auto-transformers, each of 96 kva capacity. Five taps ranging from 110 volts to 350 volts are used for propulsion, one of 45 volts is used for lighting and for the blower motor and one between the fourth and fifth tap of the propulsion voltages is used for electric braking. The controller is of the platform type with five running speeds to correspond to the transformer taps and seven positions for electric braking. The electric equipment was furnished by the Jeumont Company (Ateliers de Construction Electriques du Nord et de l'Est.).

PROGRESS ON THE PANAMA EXPOSITION

The accompanying engraving is a recent view of the grounds of the Panama-Pacific International Exposition, to open in San Francisco in 1915, and shows a part of the main exhibit section. As will be noted, the exposition lies in a great natural amphitheater encircled on the south, east and west by the hills of San Francisco and the wooded slopes of the Presidio reservation, part of which are seen in the background. The photograph was taken at a considerable elevation and consequently gives no idea of the great height of the buildings.

The large steel frame seen in the center of the gardens is that of the dome of the Palace of Horticulture. This dome is 186 ft. in height and 152 ft. in diameter. When completed it will be covered with glass and at night colored searchlights will play upon the glass from within. In the foreground is seen a part of the south gardens.

The large group of buildings on the right consists of eight exhibit palaces. Four of these face on San Francisco harbor and four border upon the south gardens. Those facing the south gardens and forming a continuous east and west façade are, left to right, the palaces of Education, Liberal Arts, Manufactures, and Varied Industries. Those facing the harbor are Food Products, Agriculture, Transportation and Mine and Metallurgy.

Panama-Pacific Exposition—Panoramic View Showing Present Condition of the Buildings and Grounds

The large white dome is that of the Palace of Education; this dome is 160 ft. in height and 100 ft. in diameter. The next dome, from left to right, not painted, is of similar proportions and belongs to the Palace of Liberal Arts. Behind the dome of the Palace of Liberal Arts may be seen the dome of the Palace of Food Products. The next building to the right and prominent in the picture is the Palace of Manufactures, on which the dome has not yet been superimposed. The cross naves in this palace, at the intersection of which the dome will be placed, are 110 ft. in height. The next dome seen is that of the Palace of Transportation; at the extreme right of the picture can be seen one corner of the Palace of Varied Industries. In the opening in the center of the group and to the right of the first two domes, will be located the Tower of Jewels, which will rise in terraces to a height of 433 ft. The tower will be pierced by an archway 125 ft. high, through which visitors will enter from the main gates of the exposition into the court of honor.

Machinery Hall, 9 acres in area, is now practically completed. Three buildings are almost finished, and all will be ready to receive exhibits by July 1 of this year. The exposition opens Feb. 20, 1915.

A forty years' concession has been granted locally to the French banking firm of Perier for the construction of a tramway line from Jerusalem to Bethlehem, the lighting of the city with electricity, and a water supply from Wady Forah.

RECOGNITION OF "GOING VALUE" FOR RATE MAKING

The unanimous decision recently handed down by the New York Court of Appeals in the case of the Kings County Lighting Company is of decided interest in the public utility field by virtue of its recognition of "going value," which the Public Service Commission for the First District of New York had refused to recognize as a tangible factor in the determination of rates. Furthermore, it confirms the Appellate Division in rejecting the commission's inclusion of annual appreciation of land as an item of income.

The main points of the decision, presented by Judge Miller, are these. The court defined "going value" for rate purposes as the amount equal to the deficiency of net earnings below a fair return on the actual investment due solely to the time and expenditures reasonably necessary and proper to the development of the business to its present stage and not comprised in the valuation of the physical property. This was to be appraised by showing the actual expenditures of the company, the original investment, its earnings from the start, the time actually required and the expense incurred in building up the business, all expenditures not reflected by the present condition of the physical property, the extent to which inefficient management or other causes had prevented or depleted earnings, and any other facts bearing on the question, it being kept in mind that the ultimate fact to be determined was not the amount of expenditures but the deficiency from fair returns for causes under consideration.

The court stated that the difficulty of determining the item of "going value" would not justify the disregard of such a factor. It might be conceded that "going value" had no existence apart from tangible property and that commercially there was but one value, that of the property as a whole. As the rates, however, could not be made to depend upon the exchange value (which in turn would depend upon the rates), it would seem to be necessary to appraise the physical property and the going value separately.

The main point to be decided in the case was the rate to be charged not by a new company with no business but by an old company with an established business, and the decision of the court had to cover an investigation of whether or not the company had already received a fair return on its investment. The court decided that inasmuch as no dividends appeared to have been paid by the original company or by the present company prior to 1907, the company had not received a fair return in the earlier years. On the assumption that there was a reasonable need of the service from the beginning and that the failure to pay dividends was not caused by inefficient management, an accumulation of a surplus or undivided profits, the investment of earnings in permanent additions or betterments, none of which was asserted, the court decided that "going value" was an element in this case which the commission should have determined.

Indiana Union Traction Company—Concrete Bridge Over Blue River Between Muncie and New Castle

Indiana Union Traction Company—Concrete Arch Bridge at Fayne Junction

Indiana Union Traction Company—Plate Girder Over Big Four Railroad

Indiana Union Traction Company—Steel Bridge Over Woodward Street, New Castle

RECENT IMPROVEMENTS BY THE INDIANA UNION TRACTION COMPANY

H. A. Nicholl, general manager Indiana Union Traction Company, reports the recent completion of the Muncie-New Castle line. This permits the company to give through service from Muncie to Indianapolis. Limited and local service will both be given over the new line every hour.

The new line is 18½ miles long and is exceptionally straight and level. The maximum grade is 1½ per cent and except in cities the maximum curvature is 2 deg. Full speed can therefore be maintained on all curves. The line is single-track, laid with 70-lb. rail and gravel-ballasted, 3000 yd. of ballast being allowed to the mile. Cedar ties are used except on the curves, where they are of oak. The Bonzano rail joint is used throughout.

The most interesting feature of the design of the new road is the provision for eliminating grade crossings, especially in entering New Castle. Both steel and concrete bridges were constructed and the typical ones are illustrated herewith. These bridges were designed by W. J. Watson & Company, of Indianapolis, and were installed under the direction of the master mechanic of the company, R. W. Heming.

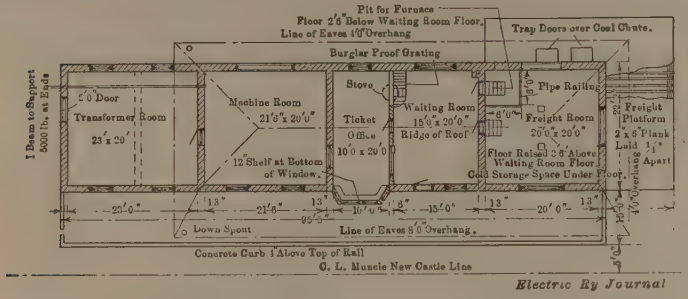
The illustrations show a remarkably graceful skew, concrete-arch bridge over the Big Four road at Fayne Junction and a concrete girder bridge over the Blue River. For the abutments and piers of these the concrete has the proportions one part of cement, two and one-half parts of sand and five parts of 2-in. broken stone or gravel. For the arch rings, spandrel walls, girders, beams, slabs and copings, one part of cement, two parts of sand and four parts of 1-in. broken stone or gravel were used. All concrete was machine-mixed, and in placing reinforcement the minimum distance allowed between steel and concrete surface was 2 in. In mixing concrete the contract called for the following quantities of ingredients per cubic yard: 1.3 barrel cement, 0.46 cu. yd. sand and 0.88 cu. yd. stone. Typical steel bridge construction is shown on this page and the preceding one.

For all of the bridges uniform moving loads of 4000 lb. per linear foot of track were assumed with a concentrated load of 50,000 lb. on one axle at any point.

Indiana Union Traction Company—Combined Station and Substation at Springport, Ind.

The steel bridges were designed to conform to Cooper's specifications for steel railway bridges.

Views are also shown of a typical station, located at Springport, about 11 miles south of Muncie. This is a combined passenger and express station and electrical substation. The building was designed for operating efficiency so that one man can act as substation operator and at the same time sell tickets, etc. The ticket office is between the two main sections of the building with easy access to both.


Pit for Furnace
Floor 2'6" Below Waiting Room Floor
Line of Eaves 1'0" Overhang
Tray Doors over Coal Chute.
Burglar Proof Grating
I Beam to Support 5000 lbs. at Ends
6'0 Door
Transformer Room 23' x 20'
Machine Room 21'6" x 20'0"
12" Shelf at Bottom of Window.
Store
Ticket Office 10'0 x 20'0
Waiting Room 15'0" x 20'0"
Ridge of Roof
Pipe Railing
Freight Room 20'0" x 20'0"
Floor Raised 2'6" Above Waiting Room Floor. Cold Storage Space Under Floor.
Freight Platform
2" x 6" Plank Laid 1" Apart
40'0" Overhang
23'0"
21'6"
10'0"
15'0"
20'0"
Down Spout
Line of Eaves 8'0" Overhang.
Concrete Curb 1" Above Top of Rail
C. L. Muncie New Castle Line
Electric Ry Journal

Indiana Union Traction Company—Plan of Station and Substation Building at Springport, Ind.

On the substation side the rotary-converter room adjoins the ticket office with the transformer room beyond. The roof of the latter is higher than the main roof to accommodate the incoming high-tension lines. The other end of the building contains the mailing room and the freight room, the latter having its floor at the elevation of the loading platform. This gives coal storage below without much excavation.

HOUSE MOVING JOBS

BY G. H. M'KELWAY, ENGINEER OF DISTRIBUTION BROOKLYN RAPID TRANSIT SYSTEM

The moving of a building across the tracks of a street railway is an operation never enjoyed by either the person moving the house or the officials of the railway. To the house movers there is always the danger that the house will be damaged by the overhead wires or the necessity of spending much money in having those wires moved out of the way, while to the railroad company the job means more or less interference with the operation of cars. To both, in order to minimize delays to the car service, house moving means night work with its attendant discomforts and dangers.

Although the greatest sufferer is generally the railway company, yet it cannot refuse to cut its wires and let the building pass. This fact has been decided by the courts. But the same decisions have said that the house mover must cross at such times and in such manner as to cause as little delay as possible, and also that the railway company can use its own employees in caring for its wires and charge their time together with any other expense to the house mover.

That the railway company should expect the mover to pay any part of the cost of caring for the wires is often a surprise to the latter. He seems to think that the house has as much right on the street as the cars of the railway, and that if the company has obstructed the full use of the streets by putting up its wires it should be compelled to remove them without charge whenever necessary.

When the average owner has found out that the company expects him to bear the expense of moving the house across the line, the next thing that he will wish to do will be to bring to the office some politician who he believes has enough power to compel the railway to let him pass free. It is almost always a mistake to succumb to any pleadings or threats from the "city father," for if he once succeeds in procuring the privilege for one constituent he will advertise his achievement everywhere, and then it will be hopeless to expect any payment for later cases.

The proper way is to have a representative view the building and ascertain its height, on the timbers, to see whether the wires will have to be cut or whether they can be raised to clear the top of the house during its movement across the track. It is important that an employee experienced in the work see the house personally, because it is very dangerous to accept the statements of the owner or house mover in regard to the height of the building. Both of these men are very prone to underestimate the height of the house and also the time that it will take to move it across the tracks.

After the employee has viewed the building and estimated what it will cost to care for the wires, and due allowance has been made for contingencies like bad weather, the owner or house mover should call at the office to sign a carefully worded agreement and also to deposit in advance the estimated amount which the work will cost the railway. This advance deposit should be insisted on in all cases, especially where the signer of the agreement is the house mover and not the owner of the building, for many movers rent much of their equipment and are not on a very sound financial basis. Even when the deposit is more than necessary it is well to place in the agreement a paragraph which requires the payment, by the person moving the house, of any contingent expense not covered by the deposit.

If the house owner should object to the deposit of enough money to cover the usual liberal estimate, he may be told that the money will be kept for a few days only and that then the surplus will be returned. To the actual cost of labor and material a charge of 10 or 15 per cent should be added to cover supervision and the use of tools. This item should be explained in the agreement to avoid misunderstanding. The agreement should also contain clauses calling for at least twenty-four hours' notice before the house is to cross the line, so that arrangements can be made for getting out the line crews without trouble and also to permit the rearrangement of the car schedules which will be disturbed by the crossing. The agreement, further, should specify the hours between which the crossing will be made, this time being preferably in the early hours of the morning. In order to prevent careless work which will block the line longer than necessary, the house mover should have a certain definite time in which to do his work. If the line is blocked for a longer time, he should be made to pay a specified sum for each hour or fraction thereof as liquidated damages for the delay.

An agreement holding the railway blameless for any damages on account of the moving of the house should be prepared by the legal department, or approved by it.

Beside the requirement calling for the payment of all expense directly incurred on account of the crossing, some companies require the person who moves the building to pay a depreciation charge based upon the value of the wire cut. This charge is generally a percentage of the cost to run a reel of wire of the size damaged on account of the crossing. While this practice is confined to only a few railways, it is probable that it is not followed more extensively because the other companies do not know that such a charge is made by anyone. As there is no doubt that the wire is damaged by the cutting, it seems only fair that the house mover should reimburse the railway for its decreased value as well as for the direct expense of the labor and material. The only doubtful point would be the percentage of first cost that should be considered as the value of the depreciation.

NATIONAL EFFICIENCY EXPOSITION

At the National Efficiency Exposition which was opened in New York City on April 4, several sections of the exhibit were devoted to rapid transit matters, the Public Service Commission of New York, First District, and the Interborough Rapid Transit Company being among the exhibitors. Efficiency in the operation of public utilities and in the construction of subways is the keynote of the Commission's exhibit, which is divided into two parts—one relating to the regulation of corporations and the other to rapid transit.

Models, charts and lantern slides are prominent features of the rapid transit section of this exhibit. Among the models are interesting representations of the proposed subway stations on the new dual subway system at the Grand Central Station and at Times Square. The Commission also shows a model of the new subway car to be used by the New York Municipal Railway Corporation in the operation of the new Broadway-Fourth Avenue subway. This model was built by the Brooklyn Rapid Transit Company and is loaned to the Commission for the exposition. The new car will be 67 ft. long and 10 ft. wide, whereas the cars used in the existing subway are 51 ft. 5 in. long and 8 ft. 8¾ in. wide. It is calculated that the new car in rush hours will seat seventy-eight persons, as against forty-four in cars now in use. There is also a chemical laboratory with apparatus such as is used for determining the purity of air in the subway. This will be used to make an analysis of the air from day to day in the Grand Central Palace, the building in which the exposition is being held. Charts showing the results will be placed on exhibition.

Not the least popular feature of the rapid transit exhibit is a stereopticon displaying on a screen rapidly succeeding views of actual subway construction. These views are taken from actual photographs made by the Commission's photographer during the progress of the work, and they tell the story of subway building from the breaking of ground to the operation of trains. Maps of the dual subway system and charts showing the number of contracts already awarded are prominently displayed.

In the exhibit covering public utility regulation the Commission shows many interesting illustrations of its work. In this exhibit also there is a stereopticon exhibition. It is devoted principally to the illustration of various protective and safety devices used by corporations under the jurisdiction of the Commission—many of them installed by order of the Commission. There are also shown some of the results of the Commission's work in regulating transportation companies. Models and photographs of old and new street cars are displayed, including a model of the new center-entrance car of the Brooklyn Rapid Transit System which has been loaned by the company, and photographs of the New York Railways Company's new types of cars, including the so-called stepless car and the double-deck car. There is also an interesting photograph of the street-car parade made by this company last year, when all types of cars from the little horse car of the eighties to the stepless car of the present day were exhibited in the streets. Illustrations also are given of the Commission's work in improving the ventilation of street cars.

Many interesting charts showing the peculiar conditions of traffic in this city are displayed. Others show the investment in transportation, gas and electric properties in the city of New York, and the number of stock and bond applications approved in comparison with the number rejected. On such charts it appears that there are ninety-eight actual operating and lessor companies, of which sixty-eight are transportation and thirty gas and electric corporations. The combined capitalization of the ninety-eight companies is $1,173,630,574. During the life of the Commission applications for the issue of stocks and bonds aggregating $761,046,557 have been made. Of these the Commission allowed $517,535,219, and disallowed $182,616,622. The applications representing the difference between these amounts were either withdrawn or were pending at the end of the year. The total amount of money collected in passenger fares during the last fiscal year was $87,718,359, which is equivalent to about $17.50 per capita on a basis of 5,000,000 population.

INTERBOROUGH RAPID TRANSIT COMPANY'S EXHIBIT

An elaborate exhibit is given by the Interborough Rapid Transit Company. Working models, charts and photos cover completely every detail connected with operating this transit system, of which the subway division now handles upward of 1,200,000 people daily, three times its original capacity, and upon which in the last nine years 2,198,000 persons have been carried at a high rate of speed without a single passenger fatality.

A picturesque exhibit of photographs is shown which gives the history of the city of New York's transit system. The first street-car line in the world, the New York & Harlem line, was inaugurated in 1832. The first elevated railway car was in operation on Greenwich Street in 1870. This was a cable car. In 1873 the first steam elevated railway was begun, and in 1886 came the first street cable car. In 1905 the Interborough constructed its first steel passenger car.

A model of the interior telephone system of the Interborough with its 1550 phones, 8000 miles of cable, with twenty-four operators handling 16,000 daily calls is part of the Interborough's exhibit. Other working models show the multiple-unit system of car control, the electropneumatic brake, the automatic, speed-control train signal, by means of which it is possible for subway trains to approach an occupied station to within a short distance of the train ahead, and the emergency alarm system, in which alarm boxes are so located along the subway as never to be farther away from an employee than 200 ft. When the switch in one of these boxes is pulled down, the power is immediately cut off from the four rails in the subway. There are also block-signal system devices and others to show how power is conserved by the Interborough.

The "welfare work" carried on by the Interborough is illustrated by means of photographs showing the company's stores, recreation rooms, restaurants, athletic field, baseball and football teams. Statistics showing the work accomplished by the Volunteer Relief Association and the "Sunshine Committees" maintained by employees of the road are also on display.

The most striking feature of the exhibit is a diagrammatic elevation of a complete power station mounted above a glass box through which a stream of water flows continuously. The flowing water represents the path of the heat through the plant, various outlets of proper size being provided to show the losses that take place such as in the stack and condenser, and the effective power in the form of electrical energy being discharged through an outlet at the end corresponding to the switchboard. Another feature is a pair of photographs of 600-hp boilers, of which one is set above three model cars, the number propelled by one boiler in 1905. The other photograph of the same boiler, which represents present conditions to-day, is mounted above ten miniature cars, showing an increase of more than 300 per cent in capacity. Numerous other graphical methods of displaying efficient operation are employed and these indicate remarkably well that if the economies had not been made since the Interborough began operations, the extensions now under construction would not

have been profitable at a 5-cent fare. In fact, as pointed out by illuminated pictures, the modern sky-scraper is a possibility only because of the existing transportation facilities.

A. E. R. A. SECTION WORK AT DENVER

BY W. M. CASEY, TRAINMASTER DENVER CITY TRAMWAY AND PRESIDENT OF DENVER A. E. R. A. SECTION

The Denver City Tramway section of the American Electric Railway Association was organized Sept. 19, 1912, with a charter membership of thirty-two. Since that time it has enjoyed a steady and healthy growth until, at present, we have 100 enthusiastic members.

Meetings are held on the third Thursday of each month, and the attendance invariably reaches about 90 per cent of the total membership. Each meeting is confined to the discussion of a single subject, upon which a paper is prepared by someone who is thoroughly conversant with all matters pertaining thereto. After the reading of such paper a general discussion ensues, all questions brought out thereby being thoroughly gone over. The proceedings are taken by a stenographer and published in the *Tramway Bulletin* for the benefit of those who wish to make a deeper study of the points brought out.

The eligible list includes all employees of the company. Each department is, therefore, well represented, trainmen being in the majority. Subjects for discussion are varied in order that each department may "have its inning." This method serves a double purpose; first, the employees of each department acquire a knowledge of their own work, which renders them more efficient in the performance of their duties; second, the employees of each department learn of the trials and troubles of the others, thus giving them a better understanding of the work performed in other departments and rendering them more tolerant of such shortcomings as may be attributed to fellow workmen. The heads of the various departments, as well as all others in authoritative positions, are regular attendants and enthusiastic supporters of the section, fully realizing its importance as an educational factor.

Briefly, the section has developed a unity of purpose that never before existed, having for its object the improvement of the industry in general and of the Denver City Tramway in particular.

Each employee who becomes a member very quickly realizes the advantages to be gained for himself, the opportunity for education and the advancement toward greater efficiency which such membership affords. He at once becomes a responsible part of the system and a booster for the welfare of the company.

To carry this idea out a little further, let us imagine a system with 1000 trainmen (all members of the company section), coming in daily contact with hundreds of thousands of people. What a wonderful factor as a molder of public opinion this would be!

It is my opinion that the establishment of company sections in the various cities throughout the country is one of the most noteworthy aims ever conceived by the American Electric Railway Association. The surprising feature to me in this connection is that a great many member companies have withheld their interest in the movement.

The breadth of the subjects discussed since the organization of our section is indicated by the following list:

SUBJECTS DISCUSSED AT THE REGULAR MONTHLY MEETINGS HELD BY THE DENVER A. E. R. A. SECTION SINCE ITS ORGANIZATION, SEPT. 19, 1912.

Oct. 23, 1912, "The A. E. R. A. Convention," C. B. Wells, Norman Read, John Messner, George Dolezal.
Oct. 23, 1912. "Benefits and Aims of Company Sections," W. M. Casey.
Nov. 21, 1912. "Progression," C. A. Swift.
Nov. 21, 1912. "Accidents," Warren C. Swisher.
Dec. 19, 1912. "Coasting and Economy," W. O. Wade, engineer Railway Improvement Company, New York.
Jan. 17, 1913. "Brakes, Trucks and Wheels," George W. Dolezal.
Feb. 20, 1913. "Development of Electrical Generating Apparatus for Traction Service," W. E. Casey.
March 20, 1913. "Conductor and His Duties," E. M. Nesbit.
April 17, 1913. "Electricity as Applied to Traction Work," Norman Read, chief electrical engineer.
May 15, 1913. "The Trainman and His Duties," E. A. Bodie, motorman, East Division.
June 19, 1913. "Lightning Arresters in Traction Work," B. C. J. Wheatlake, General Electric Company.
July and August, 1913. No meetings.
Sept. 18, 1913. "Evolution of the Electric Railway Motor," E. C. Means, Westinghouse Electric & Manufacturing Company.
Oct. 16, 1913. "Air-brakes as Applied to Electric Railway Practice," T. A. Heddendahl, Westinghouse Traction Brake Company.
Nov. 20, 1913. "The A. E. R. A. Convention," W. M. Casey.
Nov. 20, 1913. "Review of Papers Presented During tne Year," W. H. McAloney.
Dec. 18, 1913. "Track Conditions and Our Recent Storm," A. M. Evans, superintendent of way.
Jan. 15, 1914. "Relation of Conductor to Motorman and Vice Versa," T. W. Topping, East Division.
Jan. 15, 1914. "What the Duties of Motorman and Conductor Should Be and How Each Should Help the Other," H. N. Hilling, Central Division.
Feb. 19, 1914. "A Safety Millennium," C. B. Wells, superintendent of transportation.
March 19, 1914. "A Single-Phase Traction System from the Power House to the Motor," W. H. Edmunds, Denver & Interurban Railroad.

DEVELOPMENT OF THE ELECTRIC MINE LOCOMOTIVE

At the monthly meeting of the American Institute of Electrical Engineers held in Pittsburgh April 9 and 10 under the auspices of the committee on the use of electricity in mines, a number of papers were presented dealing with various phases of the subject covered by the name of the committee. Of these papers the only one of direct interest to electric railway men was that on the development of the electric mine locomotive by G. M. Eaton.

Mr. Eaton stated that during the past seventeen years the mine locomotive had been greatly improved in the matter of compactness, as shown by a reduction in block displacement per horse-power of 3.88 cu. ft. to 1.54 cu. ft. By block displacement is meant the product of the length, height and width of the machine. The improvements comprise the following features: the electrical equipment is now especially designed for mine service, the machine is staunch in construction, there is the maximum perfection of apparatus without sacrifice of easy inspection, single reduction gearing is used, the locomotive is low in height and has short overhang and the design as a whole is very compact. The improvements over the earlier type have consisted in the use of steel frames, rendering the motors and bearings accessible, the introduction of motors with commutating poles and of high continuous ratings, the use of substantial resistance grids and durable controllers with magnetic blowouts, the introduction of improved collecting devices, etc. During seventeen years the minimum height of locomotives has been reduced to about 27 in. and the possible tractive effort per inch of height has been nearly quadrupled. The paper shows clearly that the modern mine locomotive is a machine in every way entitled to respect. Much designing skill has been lavished upon it.

For several months the Liverpool Tramways Committee has had under consideration a proposal to utilize the tramway system at night for the transportation of merchandise between Liverpool and other Lancashire towns. For this traffic specially designed tramcars would be constructed. In order to provide for the prompt distribution of the goods it is proposed to create depots at different points along the route between, say, Liverpool and Manchester, and from these depots to distribute the traffic in adjoining areas by means of motor trucks. It is thought that this plan would aid in solving the dock-congestion problem.

COMMUNICATIONS

MAINTENANCE AND DEPRECIATION

State of New York; Public Service Commission for the First District

New York, April 7, 1914.

To the Editors:

In response to your request for a description of the methods prescribed by the Public Service Commission for the First District respecting maintenance and depreciation accounts and the purpose of the commission in adopting such methods, I may explain that the method of handling maintenance expenses, particularly the cost of replacements, is necessarily dependent upon the method of keeping the property or fixed capital accounts. The aim of the commission being to secure on the books of the utilities a reflection of the cost of the property used or useful at any given time in the public service, it becomes of prime importance to provide for the recording, in the property accounts, of changes that occur from time to time in the physical property. Capital expenditures do not cease when a utility begins commercial operations. Moneys must be provided for additional equipment, for extensions and for improvements, and so far as such property does not represent a mere substitution for other property no longer serviceable it represents an additional investment of capital, but there are bound to be deductions as well as additions to the investment; with population, traffic may shift, a down-town route becomes unprofitable and is abandoned, steam engines are taken off the elevated railways or horses off the surface lines, and as a consequence a portion of the investment disappears. A proper system of accounting will require that the necessary entries be made on the books to take out of the investment or property account the cost of every considerable piece of apparatus or other item of property that becomes unserviceable, whether or not it is replaced with a new instrument of the same kind.

The accounting order of the Public Service Commission therefore requires that deductions or credits shall be made to the property accounts for all withdrawals or retirements of fixed capital. With this rule, it becomes immaterial whether new property acquisitions represent replacements or additional property, for in either case the increase in the investment account will represent merely the excess cost of new installations over the cost of property retired. In financing the expenditure the company could issue new securities only for the net increase in investment account and would have to draw out of its surplus profits an amount equal to the cost of the property retired from service. If no provision were made for the deduction from revenue of the amount that represents the gradual consumption of capital in service until it becomes necessary to retire or replace such capital, the burden put upon revenue would be very unevenly distributed. A power station, for example, may be in service for a period of fifty years, in which case 2 per cent of the cost of the station is consumed annually. If, however, no charge is made against revenue for this depreciation, profits will be overstated until the station is retired or replaced, and in that year the revenue will be unduly burdened and profits may entirely disappear. Hence the necessity of making a charge against the revenue of each fiscal period for the depreciation that occurs during that period on property in service.

If the expenditures charged to the property or investment accounts are to be identified with the actual property in use, they must necessarily include not only extensions and other additions, but also renewals and replacements of all the considerable items of apparatus, equipment and structures that can be individualized. Replacements of parts of units or structures, however, are regarded as repairs, and their cost is included in the repair accounts. Ordinarily, there will not be much difference of opinion as to what piece of property constitutes a unit to be treated as a capital replacement and what constitutes *part* of a unit to be treated as a repair or maintenance replacement, except in the case of continuous capital such as track, electric line construction, etc. To secure uniformity it may become necessary to define a unit of track, etc. For the present, the commission has contented itself with making a $100 expenditure the boundary line between capital replacements and repairs of structures. It may be observed, parenthetically, that the new subway contracts contemplate the specification by the commission of the "principal parts" of the railroad and equipment, which upon their retirement, will be chargeable to the depreciation fund as distinguished from the minor parts, which will be maintained by charges to the repair accounts. The Board of Supervising Engineers in Chicago has already had occasion to prepare such schedules of principal parts in order to distinguish between charges against the maintenance fund and the renewal fund.

In order that the consumption of capital other than that replaced by repairs or ordinary maintenance may be taken into account in the derivation of profits, the commission's accounting rules require utilities to set aside out of revenues the amounts estimated to be necessary to provide for the ultimate replacement of property. Such amounts are included in maintenance of way and structures and maintenance of equipment and constitute with repairs the upkeep of the property. The reason for this combination is that the life of the physical property (and hence the depreciation) is dependent upon the promptness with which ordinary repairs are attended to. If repairs are neglected and the property allowed to run down and its life expectancy shortened, there will remain a larger balance in the depreciation reserve to take care of the earlier replacements necessitated by a policy of skimping repairs. A blanket depreciation estimate, however, cannot yield entirely satisfactory results, and this method is to be regarded merely as a first step.

As stated in the report that I presented as chairman of the committee on statistics and accounts of electric railways at the annual convention of the National Association of Railway Commissioners in Washington last October, "The discussion of renewal and depreciation accounts in this country is still in its early stages. The Interstate Commerce Commission in its classification of operating expenses of steam railroads in 1907 prescribed depreciation and renewal accounts for the several classes of rolling stock, and since then several of the state commissions have required electric railways to set up depreciation accounts in two or more groups. * * * There is a growing belief, however, that accuracy in estimating the necessary reservation to be made for deferred renewals must necessarily depend upon the detailed itemization of renewals. This has been recognized by the Interstate Commerce Commission in its accounting series circular No. 35, containing the tentative 1913 revision of operating expenses of steam railroads. Each of the numerous repair accounts is combined with its own depreciation account. Under Maintenance of Road, for example, there are thirty primary accounts besides the depreciation accounts, twenty-three in number. Such detail in accounting will eventually insure more careful and accurate estimates of current depreciation as it occurs.

A. F. Weber, Chief Statistician.

Macon Railway & Light Company
Macon, Ga., April 3, 1914.

To the Editors:

I have read with a great deal of interest the editorial in your issue of March 21 on the subject of maintenance and depreciation, and the communication of President T. S. Williams, of the Brooklyn Rapid Transit Company, together with others appearing in the two issues, which seem to strike the nail fairly on the head. Should other executive and accounting officers express their views, a much more comprehensive understanding can be reached. In the meantime good, wholesome food will have been digested by the time of the American Electric Railway Association convention next October, with the result that a better understanding among the various railway presidents, managers and accountants will be obtained.

There must necessarily be some give and take in attempting to standardize where it requires the approval of a number of persons and corporations; but if the accounting officers will make a careful study of the proposed new tentative system of accounts, a great majority of them will, I believe, feel that it comes nearer meeting all requirements than any proposition presented to date.

Personally, I think that the American Electric Railway Accountants' Association, together with the representatives of the Interstate Commerce Commission, are to be congratulated upon the results obtained, and I for one have no criticism to offer.

Lem S. Boggs, General Manager.

TENTATIVE SYSTEM OF ACCOUNTS

Mobile Light & Railroad Company
Mobile, Ala., April 4, 1914.

To the Editors:

When accounting series circular No. 41 was issued by the Interstate Commerce Commission on Feb. 28, 1914, accounting officers were invited to offer criticisms and suggestions, but as March 21 was stated as the latest date for the receipt of such criticisms or suggestions, and it is manifestly impossible for any one to study carefully each item covered by the classifications in the space of three weeks, it is unfortunate that more time was not allowed by the commission for the proper study of the proposed classifications. Just why electric railways were given three weeks, and steam railways over three months for criticisms of proposed changes in classifications to take effect on July 1, 1914, has not been explained.

The chief examiner of accounts of the commission has gracefully acknowledged the assistance of the committee on a standard classification of accounts of the American Electric Railway Accountants' Association, in the preparation of the tentative classifications, and I feel that the thanks of all electric railway accountants should be tendered to the members of this committee for their valuable work.

The general instructions accompanying the classifications seem to have been prepared with great care, and contain important instructions which are necessary to a proper understanding of the text of the accounts.

The method of handling "rents" in the new classifications is open to discussion, and it would seem to be desirable to make some changes in the plan proposed. The balance sheet and profit and loss accounts appear rather elaborate for a small property, but their use by all lines will prove of great advantage to investors and others interested, and should be welcomed by the publishers of financial manuals, as an examination of the balance sheets now published from year to year in various manuals shows that they are not uniform. Some contain items consolidated to such an extent as to make them worthless for comparative purposes or for the determination of actual conditions.

The proposed forms of income account, general balance sheet and profit and loss accounts have not been issued before by the commission for the use of electric railways, and, although these accounts are similar in many respects to the steam railway classifications in use, most electric railways have been using forms of income account, balance sheet, and profit and loss statements that were prepared to meet the needs of the officials of each particular line. Radical changes will be necessary with some lines to conform to the new classifications, if adopted. As these classifications will probably be adopted as standard throughout the country, careful attention should be paid to every item shown.

An important change in the classification of operating expenses is the introduction of a new general account under the heading "power," "in order to bring together, under one general account, the expenses incident to the maintenance and operation of power-plant building and equipment, etc." This change is very desirable, but why should not this account include all determinable operating expenses affecting power, such as the cost of insurance on buildings and equipment, boiler insurance, accident insurance, payments for injuries and damages, stationery, etc.? These expenses are now grouped under the head known as "undistributed accounts."

The use of these accounts, in my opinion, is a reflection on the ability of electric railway accountants, as it is practically an admission that the items do not belong under the head of "general expenses," but to save possibly a little work they are shown as "undistributed." In my opinion the classification should provide primary accounts under the proper headings for the so-called "undistributed accounts," and if any companies desire to show such accounts as "undistributed" they may be permitted to do so, but all reports to the commission should show the charges properly distributed. The monthly and yearly reports of operating expenses of all companies would be much more valuable if all determinable charges were shown under each general account. Taxation problems, valuation problems and cost-account systems would all be helped by the abolishment of the present "undistributed accounts," as, in my opinion, there is no valid excuse for their existence. If they are general administration expenses, they should be shown as such, and not be carried in the classification in their present shape.

Under "way and structures," "equipment" and "power," equalization accounts have been provided. While these accounts may be used by some companies, they offer an opportunity for manipulation, and I do not believe that they are either desirable or necessary. By charging material to operating expenses when used, and not when bought, and by charging labor in the month in which it is expended, each month's operating expenses would reflect the actual expenses of that month, and would not show a fictitious amount, that might be desired for some special reason.

A separate primary account for parks, etc., has been used by this company for several years, and it would seem desirable to include in this account the maintenance and depreciation charges on parks and resort property.

A new account, No. 40—"equipment retired"—has been provided, and instructions have been issued concerning the treatment of depreciation and charges for abandoned property. There has been no uniformity in the past in handling of charges for depreciation, and property retired or abandoned, and any step toward standardizing in this direction should be welcomed.

Taken as a whole, the classifications are generally acceptable from an electric railway accountant's point of view, and it is fortunate that such is the case in view of the limited time given for the presentation of criticisms, or objections, to the commission.

M. W. Glover, Secretary and Auditor.

Atlantic Coast Electric Railway
Asbury Park, N. J., April 3, 1914.

To the Editors:

I have carefully examined the tentative classification of accounts promulgated by the Interstate Commerce Commission. I do not find a great deal of material for discussion as they are very similar to the classification adopted by the Public Utility Commissioners in this State. I will say, however, that the result shows painstaking efforts on the part of the committee, and I hope their efforts will be rewarded to the extent that the classification will remain in effect without further changes for some time. G. B. Cade, Secretary.

Union Traction Company of Indiana
Anderson, Ind., April 6, 1914.

To the Editors:

I have read with considerable interest the communications regarding the Interstate Commerce Commission accounts in the April 4 issue of the Electric Railway Journal. In the letter from Mr. Bigelow, auditor of the Joplin & Pittsburgh Railway, mention is made of the introduction of an account for amortization of franchises. Mr. Bigelow is evidently under the same misapprehension regarding the purpose of this account as some other accountants who have not fully understood the purport of the text.

This account is intended to include each month the monthly proportion of the *cost* of limited franchises. This "cost" is the only amount that must be amortized and there is no provision in the account for amortization of the value of franchises merely because such franchises may have been valued by the company and are included in its statement of assets and liabilities. The account, as provided, will not be used unless the company has actually made expenditures, such as legal expenditures or cash payments to municipalities for the purpose of securing franchises. The new system of accounting is not retroactive; if the cost of securing a limited franchise had been $30,000 and twenty years of the life of the franchise had expired at the date the new classification became effective, there seems to be no good reason why it would not be perfectly proper for the carrier to charge operating expenses with $1,000 per year for the remaining ten years of the life of the franchise. If, however, the entire cost had been originally charged to capital accounts I do not believe the Interstate Commerce Commission would expect or require a company to go back to the original entries and take out the remaining one-third of the franchise cost for the purpose of charging it into operating expenses during the next ten years.

The text of the account, as submitted in the tentative classification, was revised at the recent meeting in Washington of the committee on standard classification of accounts with the Interstate Commerce Commission representatives, in order that the account would be better understood.

W. H. Forse, Jr., Secretary and Treasurer.

MOVIES FOR ELECTRIC RAILWAYS

Washington Railway and Electric Company
Washington, D. C., April 7, 1914.

To the Editors:

I heartily endorse your editorial in the Journal for April 4, on "Movies for Electric Railways." I have just finished a course of lectures to our trainmen, and I am thoroughly convinced that this is one of the best ways of instructing the men, as much more can be accomplished in a shorter time than by any other means that I know of.

I also endorse your proposition for a central agency, as in our case we had to secure a moving picture reel from Chicago at considerable expense. Now that all of our men have seen this reel, it is but little use to us, excepting to show to new men who are just entering the service. I hope that your suggestion will be taken up by the American Electric Railway Association and pushed through as rapidly as possible, as I believe great good can be accomplished by such a method.

W. F. Dement,
Assistant Superintendent of Transportation.

DISCUSSION ON PUBLIC UTILITY VALUATION AND DEPRECIATION

At a meeting of the American Society of Civil Engineers on April 2 further discussion developed on the report of the committee on valuation for rate-making purposes. This committee is composed of F. P. Stearns, chairman, T. H. Johnson, W. J. Raymond and Alfred Noble, J. P. Snow and Leonard Metcalf.

The session was opened by G. S. Williams, Ann Arbor, Mich., with a brief explanation of the importance of the subject and the advisability of thrashing it out to a definite conclusion, to which the support of the society would be given. The main characteristics of the general discussion following were that it dwelt almost entirely with principles of railroad valuation to the exclusion of other forms of public utility enterprise and that it was inadvisable to bring in at this time the subject of rate making as an object for valuation.

Prof. G. F. Swain, of Harvard University, commended the report highly as to its general conclusions and the value of the matter collected, but criticized its contents regarding the question of depreciation and the bearing of that item on the topic of valuation. Professor Swain considered that rates should be based upon the cost of reproduction new and not upon this item less depreciation. He thought that a depreciation allowance should be set aside each year for keeping the property up to date without additions to capital, and he favored a sinking fund method for this. Any method which included the consideration of the original cost, he thought, would be impracticable, because in many instances the figures on this would not now be available. He did not favor repeated determinations of cost of reproduction new but thought that such determination supplemented by a requirement for correct accounting to take care of future depreciation would be the most practical method of procedure. Professor Swain presented data for an interurban electric railway ten years old, at the present time earning a net of 12 per cent and paying 8 per cent in dividends with a 4 per cent annual surplus to provide for depreciation and renewals. The figures showed that the net earnings of the first few years were low and had all been paid out in dividends, so that in the ten-year period there had been accumulated only a 12 per cent total depreciation reserve. In case the records of the company should be lost and a valuation be made, the cost to reproduce new would be found as the original cost, $1,000,000, and the depreciated value on which the committee would base the rate would be $720,000. It is to be noticed in this regard that the committee included in developmental expense the early deficit between what was earned and the desirable 12 per cent, thus bringing the total value back up to $1,000,000.

D. W. Lum, Washington, D. C., made a protest in regard to the presentation of a report on rate-making

at the present time. While admitting the influence of the society and believing that it would not desire to have any unjust situations created by any report on the subject, he failed to see how the methods proposed by the committee were in harmony with present practice, and he believed that the committee should have followed its instructions and adhered to the federal law governing appraisal of common carriers' properties for no specific use. Mr. Lum made an argument for "service value" as a basis for rates.

Samuel Whinery, New York, gave a brief discussion of some of the general factors involved in the report. He objected to the introduction of many involved theories and diction, upon the meaning of which engineers themselves were divided and which therefore would be most incomprehensible to men in other professions. In particular, he objected to the term "depreciation," holding that the conflicting views in regard to it were caused by a misunderstanding of its use. What he really understood by depreciation was a diminished value determined by price and not from any probability of life or actual experience. He thought that a valuation could be made without considering depreciation and that expert appraisers would not be inclined to pay much attention to any depreciation formulas.

Martin Schreiber, Newark, N. J., presented to the association the results of the investigation made by the committee on life of railway physical property of the American Electric Railway Engineering Association, which was completed last year after three years of work. He said that this association had had access to the records of most of the large electric railways of the country, and he offered to the society the data compiled. The members of the electric railway committee had first thought that provision for depreciation in electric railway property could be satisfactorily made in accordance with the plans of the American Society of Civil Engineers but found that a practical application of this plan was unsatisfactory. Mr. Schreiber read the report of the committee to the effect that the elements causing difference in the life of similar apparatus (such as use, climate, maintenance, obsolescence, human factor, public demand, earnings, etc.) were so complex that no tables could be drawn up for the determination of the useful life and that the probable life in any case would better be fixed by careful survey.

J. N. Dodd, New York, contended that the figure to be arrived at in any valuation proceeding should be the cost of the plant of a possible competitor. This would involve the substitution of the most modern construction and equipment for that being valued.

C. R. Harte, New Haven, Conn., called particular attention to the lack of a uniform system of terms in connection with the valuation work and he mentioned in particular the different attributes to depreciation that are often confused. Mr. Harte stated that the reproduction method of cost new less depreciation was only one source of information as to value. The fair value of a property used and useful for the public was neither the cost to produce nor the cost to reproduce. It was the capitalized earning power. It had been argued that for rate-making purposes the earning power could not be considered inasmuch as it was the direct function of the rates to be regulated, but economic forces would compel the practical equalization of rates, even though different values of competing utilities would otherwise prompt them to charge different rates for the same service. Mr. Harte stated that he would substitute for physical value the inherent value of services rendered.

The afternoon session proved insufficient to accommodate all who had discussions to give on the subject so an evening session was held. One of the first speakers at this meeting was J. H. H. Muirhead, Glasgow, Scotland, who criticized the report in several respects. He thought that it should give decided definitions and also that 8 per cent did not represent an ample repayment for the early risks in railroad construction or the present operating risks. In his opinion, the value of the franchise should be included in the valuation of the property of a utility as well as the cost of protecting the utility's interest from adverse legislative action.

M. L. Byers, New York, admitted the possibility of using the "fair value-fair return" theory of rates for gas plants and water works, but thought that the committee should work out more in detail the application of this scheme to railway tariffs. He stated that railway transportation was a complicated service not comparable with the single product of gas plants and water works and that fair value and fair return must be the average of a future period in which the service would vary with the tariff and must be forecasted.

H. M. Stone, Kansas City, Mo., presented a written discussion mainly on the point that the report of the committee did not apply to railways under competitive conditions. He stated that W. J. Wilgus in his paper on "Physical Valuation of Railroads" had stated the question of depreciation for the purpose of rate making very convincingly from the standpoint of the accountant working with the engineer on the subject, but that there were equally important reasons why depreciation, in the common sense of the word, should not be deducted from the cost of reproduction new as of the date of valuation. Mr. Stone said that he failed to find any provision in the general provisions of the committee for contingent funds. His method of providing for depreciation would be by including renewals in operating expenses and providing for unusual replacements by temporary expedients. He did not see how the appreciation of land could be used directly to offset the depreciation of plant. His main conclusion was that there are values of depreciation for sale purposes not applicable to the taxation or the rate question.

J. P. Snow, Boston, of the special committee, spoke briefly on some of the considerations that the committee had in mind in planning its report. He said that it was the opinion of the members of that body that in the valuation of property and the fixing of rates the cost of service to the producer or utility should be used and not the value of the service to the user.

Mr. Williams resigned the chair in order to take part in the discussion and expressed his views on the proper definition of depreciation and on some of the factors that he thought should be included in a valuation. Depreciation was defined by him as the difference between the present worth of a future service of a new article or system and the present worth of the future service of the article or system under consideration. Mr. Williams thought that brains should be included in the valuation of a utility property and since watered stock frequently represents capitalized brain power, he thought it legitimate to include this in the valuation.

In closing the discussion, F. P. Stearns, Boston, chairman of the special committee, replied to some of the criticisms that had been aimed at the report of the committee, stating that most of these were applicable, if at all, to only the minor portions of the report. According to him, the whole question of valuation depends upon the theory that if the owner of a utility property is to receive the benefit of an unearned increment with the rise in value of its own and adjacent property, it should be required to bear the portion of an unearned decrement in cases where that occurs.

No definite action was taken at this meeting on the report under discussion, inasmuch as additional opportunity is to be given in the near future for a more general impression of the society concerning it.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

EQUIPMENT DEFECTS—TROLLEY BASES

BY C. W. SQUIER, E. E.

The functions of a trolley base are to provide so flexible a support for the trolley pole that it will have free movement both laterally and vertically while exerting the pressure necessary to keep the trolley wheel in contact with the wire.

A freely swiveling base is most essential in order that the trolley wheel may follow the overhead line. To provide this extreme sensitiveness roller and ball-bearing bases have come into general use. Both types operate satisfactorily when provided with properly hardened parts. By using ball bearings a lower base can be obtained than with roller bearings, but on the other hand roller bearings give greater wearing surfaces. Various pressure spring arrangements are in use. Some bases have springs in tension and others have springs in compression. Further, some bases have but a single spring, while others have a battery of springs.

By reason of its location the trolley base is more inconvenient to get at than other parts of a car equipment. In some cases, even, it seems to be expected to do its work without receiving any care at all. A representative of a manufacturing company which also repairs trolley equipment stated recently that many of the old bases returned to his company lack nothing but lubrication.

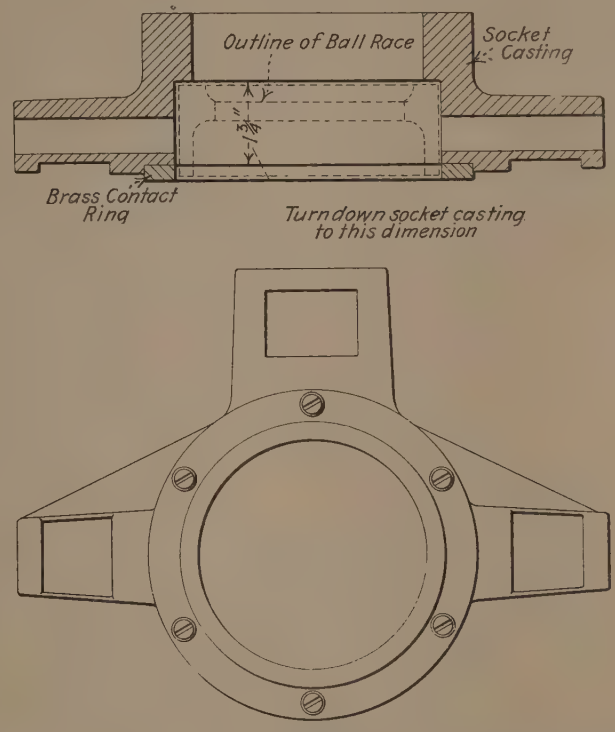
The chief troubles with trolley bases are the following: Broken or weak springs, worn bearings and pins, worn center post, loosened nuts and bolts, flat or pitted rollers or balls, burned ball races, burned or broken shunts, burned contact plates and burned-off leads or terminals.

BROKEN OR WEAK SPRINGS.

A spring which is in tension breaks most frequently at the end loops or at the bend where the loop joins the first turn of the spring. The number of such breakages can be reduced by keeping the parts over which the springs hook in good condition so that the loops have a maximum amount of bearing surface. By the use of a magnifying glass one may often discern small cracks in new springs at the bend from the loop to the first turn of the spring. These cracks are evidently due to the method of manufacture, and while such springs are strong enough to withstand heavy strains they will ultimately break at these fissures. Springs are also weakened from the gradual loss of their power to resist elongation or to the compression which follows the slow accumulation of a permanent set.

In older types of bases the full power of the springs may not be available for producing tension at the trolley pole because of excessive friction in such parts as the cross pin that forms the up and down bearing for the trolley pole, the cross head in its guide, the side rod bearings which carry the trolley spring pressure and the trolley springs themselves on their guides. It is very difficult to keep these parts lubricated, as rain forces the oil out on the roof of the car and the windows and sills often become bespattered and soiled from oil. In the later designs of stands an effort has been made to provide bearings which do away with the necessity for constant oiling at friction points, and the designers have also endeavored to provide for a uniform pressure of the trolley wheel on the wire at different elevations.

Tension springs are sometimes weakened by overstretching them during installation. One bad practice, for example, is to force a screwdriver or other sharp tool between the spirals of the spring, and to use this as a lever to hook the eye over its post. This scheme



Trolley Bases—Socket Casting with Contact Ring Assembled

is liable to force the spirals apart to such a distance that they will not come back to their original position.

WORN BEARINGS AND PINS

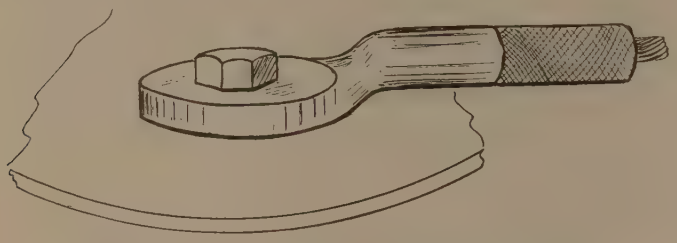
Worn bearings at various parts of the base are a constant source of trouble. In a great many cases the desire to keep down the weight has given us bases with not enough material in them to permit the boring and bushing of worn bearings. Some roads have gone to the expense of making patterns of new castings which are provided with sufficient material to allow all wearing parts to be bushed. An accompanying drawing illustrates one method of bushing a yoke to take care of excessive wear.

NUT, BOLT, BALL AND ROLLER TROUBLES

Loose nuts and bolts are a constant source of trouble on all parts of a car equipment. Trolley bases are no exception, as they are constantly under vibration. All

nuts should have lock washers, and if difficulty is then experienced cotter keys should be added.

Where ball bearings are used the races are usually insulated from the socket casting to prevent them from carrying the trolley current. Notwithstanding this precaution, the frequent discovery of burned ball races and balls shows that they do carry current. This action may take place in several different ways. For instance, the contact shunts that carry the current from the socket casting to the base plate occasionally get bent out



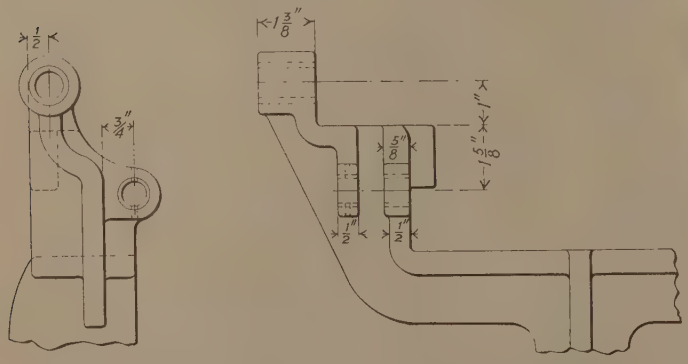
Trolley Bases—Soldered Terminal for Leads

of position so that they bear on the race and socket casting at the same time. Current then passes across the contact face of the shunt to the ball race and thence through the balls to the base plate, causing the burning of the balls and race. Moisture and dirt collect on the surface of the insulation, and the current then has an easy path to the ball race. Again, contact shunts are sometimes torn off entirely and current then passes over the surface of the insulation from the socket casting to the race.

When new ball races are installed care should be taken to see that the lower edge of the ball race does not project beyond or come flush with the contact surface of the socket casting. This precaution will prevent the contact shunts from bearing on the race, for then they cannot touch the edge of the race while still remaining in contact with the face of the socket casting.

BURNED OR BROKEN SHUNTS AND BURNED-OFF LEADS OR TERMINALS

Of necessity, trolley bases must be made very low. As a result, the distance from the socket casting to the base plate is usually not more than 1 in. to 1¼ in. This, then, is all the space that is available for contact shunts. It is very difficult to get in this space a spring



Trolley Bases—Bushings Pressed in Yoke

which is efficient enough to give the necessary current transmitting pressure of the contact shunt against the socket casting. The springs soon take a permanent set and arcing then takes place between the contact surface of the socket casting and the shunt. As a result, the shunt is burned away or else the contact surface of the socket casting becomes so rough from the arcing that the shunts are torn off. The surface of the socket casting is thus destroyed, and in most cases it is necessary to install a new casting. A second drawing shows a brass contact ring which was made to screw to the face of the socket casting. As this ring is of brass, it forms a better conducting surface than the steel casting, and if it becomes burned it can easily be replaced at small expense. This ring also permits the re-use of socket castings that have become slightly burned since the lower face of the casting can be turned off for the reception of the contact ring.

The common form of terminal used on trolley bases consists of a hole in a lug to receive the lead. The hole is provided with set screws to clamp the lead in place. Leads become loose from the working out of the set screws or because the screws are not tightened when a new base is installed. If the screws stay in place, they soon become so rusty that it is almost impossible to remove them when it is necessary to install a new base. If the leads become loose, the arcing thereby initiated soon burns away the lead and terminal. A better form of terminal which can be quickly and easily removed is shown in an accompanying drawing. This consists of a standard soldered terminal such as is used for the ground leads on motors. If the trolley lead is soldered into this properly, there is no danger that the lead will burn off at this place. This terminal is then bolted to the base plate, where a spot-finished surface is provided to give a good contact surface.

HANDLING LONG GIRDERS ON A SHORT CURVE

BY JACK ABBOTT, SUPERINTENDENT FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY

In rebuilding at Lafayette, Ind., the Wabash River bridge which was wrecked by the flood of March, 1913, it was necessary to transport thirty-six girders 120 ft. 4 in. long and 9 ft. 7 in. high. A pair of these girders of the type shown in the accompanying cut weighed 184,000 lb. The girders were loaded on three rigidly coupled cars, the middle car being used as an idler. It

Handling Long Girders on Short Curve

was impossible to turn the girders in the street at the location of the bridge. The steam railroad therefore turned the girders over to our local street railway at the first siding, about 8 miles out of town. As our line has some very sharp curves it was necessary to take the middle car out. We carried one section at a time, making the girder itself serve as a coupling pole. The view shows the position of the bridge girder relative to the rail on a 100-ft. radius curve, and in this position it swung clear of the car about 20 ft.

A "safety-first" meeting of the trainmen of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, held on March 10, 1914, in New Albany, Ind., was attended by more than 100 conductors and motormen of the two companies.

CONCRETE-MIXING CAR FOR REINFORCING DECAYED POLES

BY A. J. PURINTON, GENERAL SUPERINTENDENT EAST ST. LOUIS & SUBURBAN RAILWAY

In former years, when the price of wooden poles was much lower than at present, it was the custom to replace them with new ones when the decay at the ground line was such as to leave a doubt as to their safety. The growing demand, along with the subsequent increase in price, has caused many companies to take steps

End View, Showing Chute Transportation of Concrete from Mixer to Reinforce Pole

to preserve the life of each pole as long as possible. Although a pole may be in good condition otherwise, it decays and will finally break at the ground line.

The Orr system of using reinforced concrete, as controlled by Hubbard & Company, Pittsburgh, Pa., to strengthen the pole at its weakest point has been used successfully for some time by the East St. Louis & Suburban Railway, East St. Louis, Ill. Recently, however, the railway company has devised a new method of carrying, mixing and depositing the concrete, which has reduced the cost materially by saving both in time and labor.

Previous to building the concrete-mixing car which is now used, material for the reinforcing was loaded on a work car and transported to the site where the concrete was mixed and placed by hand. It was found, however, that for reinforcing either a small or large number of poles, the cost of doing the work in this manner was so high as to make it almost prohibitive. In order to lower this cost of concreting, it was decided to place a small mixer on a work car to replace the hand labor as far as possible. This equipment comprised a 40-ft. double-truck flat car with removable sides at one end of which an 8-ft. square cab for housing the control apparatus was provided.

The mixer, a No. 0 special Marsh-Capron, is mounted on the rear end and is set as high on the car as overhead clearance conditions would permit, thus giving a vertical drop of about 8 ft. from the spout of the mixer to the rails. This mixer is driven by a GE-1000 motor through reduction gears, and both motor and gears are enclosed in a weatherproof housing. To eliminate the variable speed of the motor it was converted from a series to a shunt-wound, and the speed of the mixer is 20-21 r.p.m., which makes its capacity 6 cu. ft. per minute. The motor operating the mixer is controlled by the motorman from the cab.

A 200-gal. cylindrical tank is mounted directly behind the cab. Air from the brake reservoir, admitted to the tank through a reducing valve, maintains a constant pressure of 10 lb. From this tank the water is forced through piping to a small measuring tank on top of the mixer. This measuring tank is automatic in its action and can be adjusted to measure out any given quantity of water. In addition, all the material necessary for a day's work can be carried on the car. The loading skip of the mixer, when lowered, lies flat on the deck so that material may readily be shoveled into it.

The mixer discharges into a chute 18 ft. long and 10 in. square, which is open along the top to permit the use of scrapers should the concrete fail to flow. The chute is pivoted at the mixer and supported at the discharge end by a guy, thus allowing it to be swung to either side of the track and raised or lowered, as conditions may require. With a few exceptions this chute is long enough to reach all the poles on the system on either side of the track, and has sufficient fall to allow the concrete to flow by gravity. Since this car has been in operation it has been found that the cost of concreting a pole has been reduced by half or more, while from two to three times as many poles may be reinforced in a day by this equipment as by hand.

Side View of Equipment Used for the Concrete Reinforce ment of Poles at the Base

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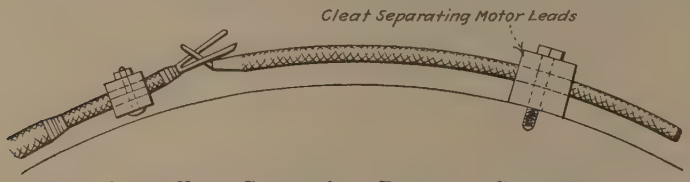
A new feature of the telephone directory which is now being distributed in New York is the useful information section for readers who desire general information. The section contains facts concerning overhead, surface and underground car service, railroad stations, ferries, public buildings, and other points of general interest.

DEVICE FOR CONNECTING MOTOR LEADS TO CONTROLLER USED TO RUN TRUCKS FROM UNDER CARS

BY R. H. PARSONS

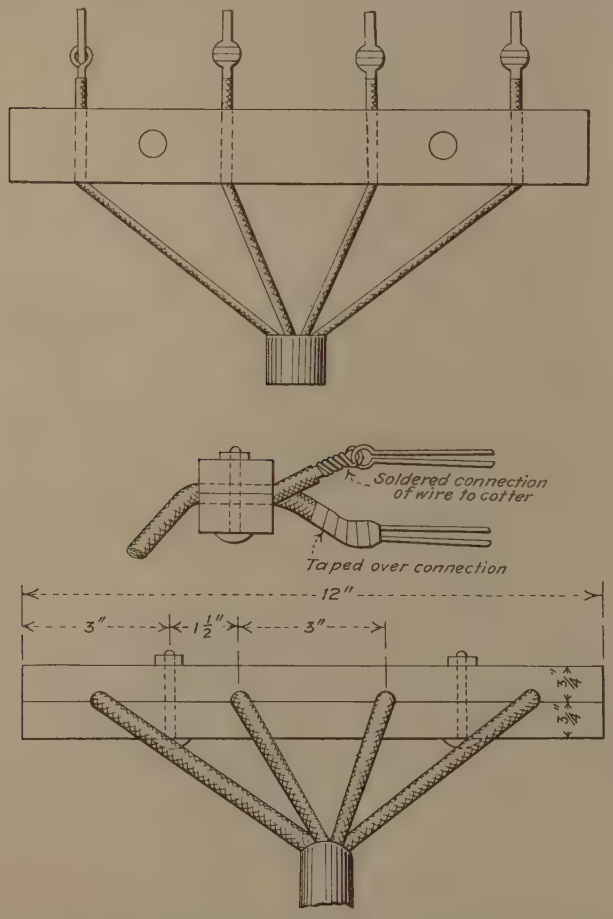
Most railways jack up their cars and run out the trucks to overhaul the equipment, and many shops are equipped with a controller and flexible cable to move the motor truck by electricity rather than by man power. Time requires that some simple device be used



Shop Controller—Connection Between Controller and Motor Complete

to make a connection between the controller leads and the motor leads. The accompanying three sketches illustrate a safe, speedy and effective method for the purpose.

It is best that the controller used be wired in connection with resistance and the four motor leads, so as to get either direction of motor rotation as in regular car service. The four motor leads, made up of



Controller Connection—Details of Connection to Cleat

No. 6 extra flexible wire and formed into a cable of sufficient length, are brought to a wooden cleat 1½ in. square and 12 in. long. When it was a solid block four holes had been drilled through this cleat to the exact size of the wires, and then it had been sawed full length in line with the center of the holes. The wires are placed in the lower half of the cleat corresponding to the order of the leads from the motor, and then both halves of the cleat are bolted together to clamp the wires in place. The wires are brought through the cleat for about 2 in. and are then attached to a spring cotter pin 3 in. long and ⅜ in. in diameter. Each wire is looped through the eye of the cotter, twisted back over itself, soldered and then taped over the connection and over the eye of the cotter.

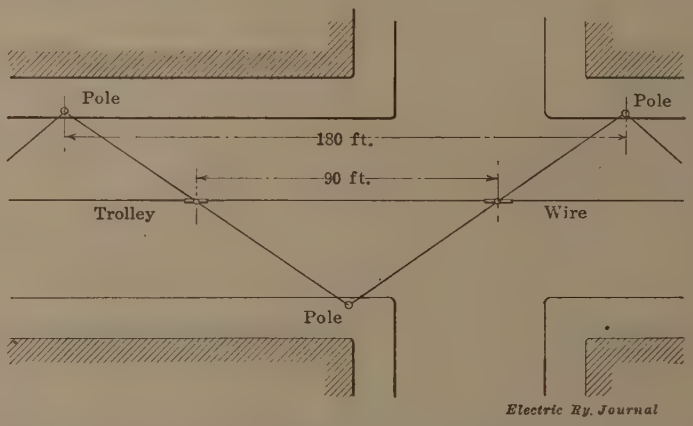
To connect the motor to the leads, simply put the cleat on the top of the motor shell and place the lead from the motor between the fingers of the cotter pin. It is not necessary to use care in matching the leads, as the motor will run as well if the two field leads from the motor are connected to the two armature leads from the controller, or vice versa, and the direction can be changed from the controller. The only exception is that if one of the motor leads is grounded on the shell or truck this lead would, of course, have to be connected to the proper lead from the controller, which could be marked in some way. The flexible cable is harmlessly and quickly removed just by pulling it off.

The method described involves no danger as the cleat can be placed on the motor or truck where convenient, the leads bent up a little, the connection made in a moment, and then the truck is ready to be moved.

DIAGONAL SPAN CONSTRUCTION ON STAGGERED POLES USED FOR SINGLE TRACK IN CLEVELAND

BY JAMES SCOTT, SUPERINTENDENT OF OVERHEAD CONSTRUCTION CLEVELAND RAILWAYS

The novel form of overhead construction which is shown in the accompanying illustration has recently been introduced on the Cleveland Railways. This arrangement consists in eliminating alternate poles on opposite sides of the street so that the span wires extend diagonally across the street from pole to pole supporting a trolley wire at intervals of 90 ft., although the spacing between two poles on the same side of the street is 180 ft.



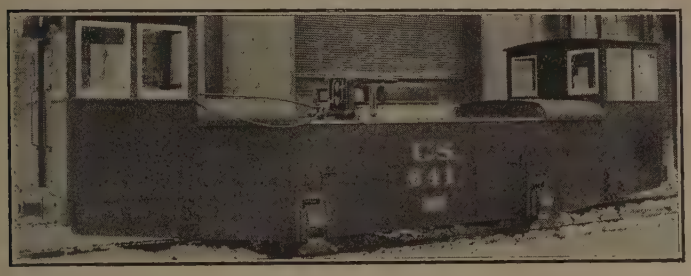
Staggered Poles for Single Trolley Wire in Cleveland

The arrangement is used on single-track lines not only because of the great reduction in expense owing to the use of only half of the usual number of poles, but also because standard double-track construction can be introduced when the line is double-tracked by setting up additional poles and moving the ears on the trolley wire. The poles are 28 ft. long set 6 ft. in the ground. They are made of standard pipe 7 in. x 6 in. x 5 in. and weigh 634 lb. The wire is maintained at the standard height of 18 ft. with a maximum sag of 6 in.

The record of passenger train performances on the steam railroads of the State of New York for the month of January shows that during the month the number of trains run was 65,954. Of the number of trains run 81 per cent were on time at the division terminal.

THREE-PHASE TOWING LOCOMOTIVES FOR PANAMA

The first electric towing locomotives for hauling vessels through the locks of the Panama Canal are now being received at the Isthmus. In all forty "electric mules" are being built by the General Electric Company. The machines weigh 82,500 lb.; measure 32 ft. 2½ in. long by 8 ft. wide by 9 ft. 3 in., the greatest height over the cabs; have an available tractive effort as high as 47,500 lb. and a windlass rope pull of 25,000 lb. Four of them, two on each side, will ordinarily propel steamships through the locks. Sometimes six engines will be needed to handle extra large vessels; in every case two astern, acting as a brake on the ship's movements, will give direction to her course.



Towing Locomotive for Panama Canal

No vessel will be allowed to enter the locks and go through on her own power.

The locomotive is built up of cast-steel side and end frames, cross-ties and bedplates. It is mounted on two axles with wheels in accordance with M. C. B. standards. The entire frame is supported from journal boxes of the regular railway type by means of coiled springs. The sides and top of the body are enclosed by sheet-iron covers which fit in place and are removable. At each end are inclosed cabs so that the locomotive may be operated from either end.

The locomotive is propelled by means of a rack rail while towing and while going up or down the steep grades from one level to another at a speed of 2 m.p.h. While running idle or on return tracks, the speed is changed to 5 m.p.h. and the machine is propelled by the regular traction method, the rack pinion being entirely released. This change is effected by manually-operated clutches located in the gear mechanism in connection with a lever in each cab similar to a steam locomotive.

The locomotive is driven by two 75-hp totally-inclosed motors of the mill type, one being direct connected through reduction gearing to each axle. Three-phase, twenty-five-cycle, 220-volt current is used and is collected by contact plows. The motor and traction gearing are mounted on a common baseplate, which in turn is mounted on a driving axle and spring suspended to the locomotive frame the same as in regular railway practice.

In the center of the locomotive is located a vertical windlass with drum, the capacity of which is 800 ft. of 1 in. steel hawser cable. The windlass, with its driving motors and gearing, is mounted on a solid baseplate and is likewise independent of the movement of the locomotive frame. The cable drum extends above the locomotive cover and has a floating guard placed around it to retain the cable while coiling loose. The windlass cable is handled by two 20-hp motors, also totally inclosed and of the mill type. One is geared for a rope speed of 12 ft. per minute at a pull up to 25,000 lb. at 2 ft. radius, and its function is to adjust the position of the ship for anchor or while being towed through the locks. The other motor is geared for a rope speed of 200 ft. per minute at 2 ft. radius, and its duty is to take up slack or pay out cable or wind in any part of the entire length of cable, as may be required. The cable drum is driven through a friction device which can be set at any desired value from zero up to the full capacity of the motor.

The traction motors, as well as the windlass motors, are controlled from either cab. The two traction motors are operated by one master controlled and contactors forward and reverse while the windlass motors are operated by a reversible drum controller, and the clutch on the main vertical shaft by a solenoid.

SCRAPER USED TO REMOVE SNOW AT SYRACUSE

During the past winter the New York State Railways purchased for trial the snow scraper shown herewith. The scraper is built of wood and does practically the same work in removing snow that a wheel scraper does in earth. It gathers the snow in a pan, and the load is dumped merely by pulling a lever. Where the haul is not over 400 ft. to 500 ft. it does excellent work.

However, as the haul was generally more than 1000 ft. the New York State Railways used it in Syracuse mostly for scraping the snow into piles to be picked up by wagons. The scraper was very efficient, as it took the place of fifteen or twenty men with shovels. The heaviest snowstorm this year, which came in the night and was practically a blizzard, made it very difficult to get extra men out to keep the special work layouts in the center of the city clear of snow. The company brought out the scraper and had practically no trouble in keeping six or eight large layouts in operating condition, by scraping the snow off the special work to the side of the street. The view shows that a man rode on the front of the scraper while it was loading, as it was found

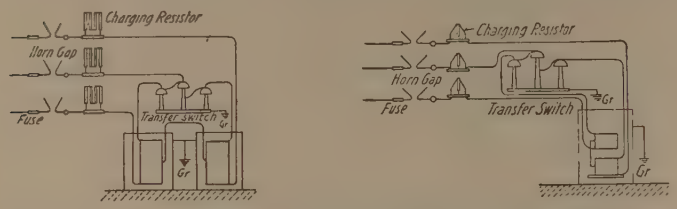
Snow Scraper Clearing Special Work at Syracuse

that, on account of its lightness, the scraper had a tendency to tip up in the front. However, this did not prove a serious objection. The scraper was furnished by the Lisbon Falls Manufacturing Company, Lisbon Falls, Me., and cost $75 delivered in Syracuse.

Lord Knaresborough, chairman of the North-Eastern Railway, England, in addressing the stockholders at their annual meeting, alluded to the electrification of the ore freight line from Shildon to Newport. The work, he said, was well in hand, and the first of the ten electric locomotives almost completed. The problem of hauling freight traffic by electric locomotives was not entirely new to the company, but this was the first instance in which it had been tried upon anything like a comprehensive scale. In view of its experimental nature, the directors had deemed it advisable to defray the whole cost, $730,500, out of current expenses.

ELECTROLYTIC LIGHTNING ARRESTER WITH CHARGE-AND-DISCHARGE RESISTOR

For protecting cable systems, motors and generators connected directly on a line without transformers, or transformers with weak insulation on their end turns, the Westinghouse Electric & Manufacturing Company has recently introduced the Type AK lightning arrester, which has a charge-and-discharge resistor in series with the standard electrolytic element. This resistor limits the charging current to a low value and damps



Diagrams of Connections for Electrolytic Arresters with Resistors

out any surges that might result in charging, particularly if the system contains enough capacity to produce resonance. The arrester is made for circuits up to 14,500 volts.

The electrolytic element consists of treated aluminum trays filled with electrolyte, stacked one on another, and separated and insulated from each other by porcelain spacers on the periphery of the trays. The number of trays in a stack depends upon the normal voltage of the line on which the arrester is to be used. The stacks after being placed in frames are arranged in welded steel tanks and immersed in oil.

In operation, a film of the electrolyte forms on the surface of each tray. This film has a high resistance at normal voltages, but a very low one at abnormal voltages. It therefore forms a free path for abnormal voltages or static charges, but upon cessation of the abnormal stress the film instantly regains its high resistance. The arrangement of the trays and the electrolyte is such that the electrolytic element acts as an electrostatic condenser. The flow of current, due to the capacity of this condenser, varies inversely as the frequency of the circuit.

When an electrolytic arrester is being charged, surging currents are set up in the system. Under most conditions these are harmless, due to insulation of the apparatus connected in the same circuit. However, to avoid dangerous surges, the graphite resistor is used to damp them out and limit the charging current to a low and safe value. This resistor is connected in series between the horn gap and the arrester in each phase. It is shunted, however, by a series of non-arcing metal spark gaps which are auxiliary to the main horn gap. In the operation of charging the horn gap is short-circuited, as usual, and at the normal voltage of the circuit the charging current takes the resistance path rather than the shunt auxiliary gap path. A discharge due to lightning or static disturbances easily breaks down the auxiliary spark gap path, and the discharge passes through the same rather than through the resistor, thereby assuring precisely the same freedom of discharge as an arrester which does not use the charging resistor. When the circuit is restored to normal voltage and frequency after the discharge the auxiliary spark gaps cannot maintain the circuit and it is shunted to the resistance path. This action is materially helped by the use of multiple gaps between-non-arcing metal. The resistor limits the amount of dynamic current flowing, and thus aids in the final action of opening the circuit by the rise and final break of the arc on the horn gap.

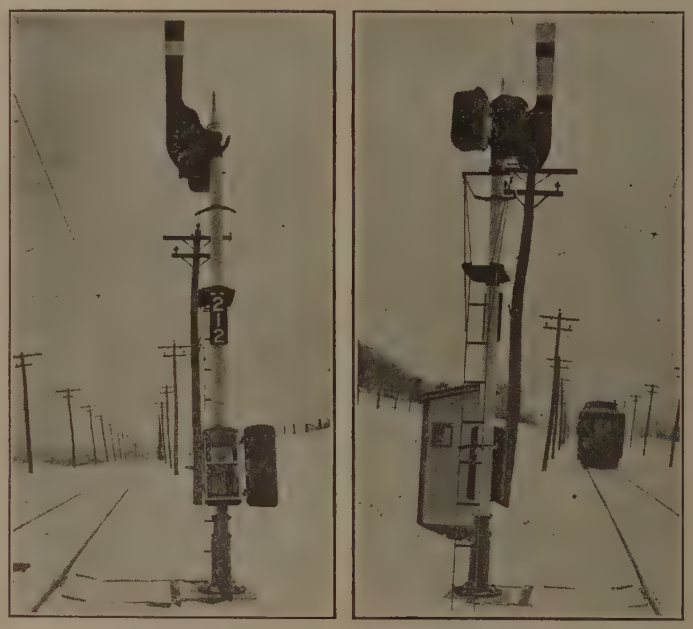
On each occasion of charging ungrounded neutral arresters to rebuild these films, after once bridging the horn gaps, the leads connecting the two middle legs to the ground and to the center fuse, respectively, should be interchanged and the gaps be bridged again, thus serving to charge all the "legs" of the arrester. To facilitate this charge a transfer switch is provided. A handwheel is so geared to this transfer switch that the switch can be reversed without the operator in any way coming in contact with live parts, the frame of the arrester being grounded.

NEW DOUBLE-TRACK SIGNALS ON THE NEW YORK STATE RAILWAYS

The New York State Railways have recently installed automatic block signals on the double-track interurban line between Utica and Little Falls, N. Y. The apparatus for this system was furnished and installed by the Union Switch & Signal Company under the direction of G. N. Brown, electrical engineer, New York State Railways, the signals being of the style-T-2", three-position type, operating in the upper left-hand quadrant.

The service on this road consists of high-speed passenger traffic as well as express and baggage delivery, the cars being operated by direct current supplied at 600 volts from an overhead trolley wire.

Current for the operation of the signal apparatus is supplied from two substations, one located at Little



Utica Signals—Front and Rear Views of Signal Mast Showing Positions of Operating Mechanisms and Relays

Falls and the other at Frankfort. The signalled territory is divided into two sections, one extending from Utica Park to Frankfort Junction, for which power is supplied from the Frankfort substation, and the other extending from Herkimer Wye to Little Falls, current being supplied from the Little Falls substation.

The substation equipment for the signals includes a duplicate set of 5-kva, oil-cooled, step-up transformers, together with the necessary switchboard equipment to provide means for cutting each transformer in or out so that either one may be used. The current is furnished at 370 volts, forty cycles, single phase, and is stepped up to the 2300-volt signaling mains, for trans-

mission over No. 8 bare copper wires installed on the pole line. At the various signal locations it is stepped down by means of oil-cooled transformers to 110 volts for the operation of the signals, and to 12 volts for the operation of signal lights and relays. The signal switchboards are provided with an ammeter, a wattmeter and an inverse time element relay, the latter being arranged to automatically open the connection to line in case of trouble.

Utica Signals—Exterior View of Little Falls Substation and Signal System—Panel Board

All track circuits are of the alternating current "two-rail" return type, with impedance bonds inserted between the ends of abutting circuits to provide a path for the return of the propulsion current. Transformers with closed magnetic circuits and without adjustable magnetic leakage blocks are provided at the various locations for stepping-down the 2300-volt current derived from the signal power mains. These transformers are also provided with suitable secondary windings to supply current at the proper voltage for the operation of the various track circuits. The track relays are of the Union Switch & Signal Company's two- and three-position, Model 12, polyphase type, and have two windings, one connected to the track and the other to the 12-volt secondary of the signal transformers. These instruments are protected by 10-amp fuses inserted in the connections between the track and the relay and 5-amp fuses in the connections between the transformers and the relays. The inductive bonds installed at the end of all track circuits are arranged to carry continuously, without excessive heating, a return propulsion current of 500 amp per rail, or 750 amp for one hour.

Utica Signals—East-Bound and West-Bound Signals and Telephone Booth Near Frankfort Substation

The signals are of the three-position type, having one arm operating from 0 deg. to 45 deg. and 45 deg.

to 90 deg. in the upper left-hand quadrant, with a.c. slots and motors. In general design and structure these signals are in accordance with the Railway Signal Association standard, with white ash blades. The electric lights for signals are of the 12-volt, 2-cp tungsten type, two bulbs being provided for each lamp so that the necessary indication will be provided should one of them fail.

The signal-control circuits are arranged for standard three-position operation, giving a two-block indication. It is impossible to obtain a proceed signal if any of the switches in the block are not in the normal position. Universal switch circuit controllers are provided at each switch and are so adjusted that, should the switch fail to be in the proper position, the signal-control circuit will be held open and the signal will indicate stop.

All switch stands throughout the territory where the signals are located are provided with lamps which accommodate two 110-volt, 2-cp Westinghouse Mazda bulbs, lighted by current obtained from the 110-volt secondary of the signal transformers. This obviates the necessity of the trackmen making daily trips to the various locations for the adjustment and cleaning of oil lamps, and assures a suitable light in the apparatus at all times.

SINGLE-TRUCK CARS FOR MERIDIAN, MISS.

During the past year the Southern Car Company, High Point, N. C., has furnished to the Meridian (Miss.) Light & Railway Company seven single-truck, non-bulkhead, vestibuled cars of the design illustrated. It is interesting to note that this type of fully-inclosed car is meeting with favor in Southern cities as well as in colder climates. The length of the carbody over the end panels is 20 ft. 8 in., and over the platform crown pieces 30 ft. 8 in. The width of the carbody at the sill including the panels is 7 ft. 10 in. and the extreme width over all is 8 ft. 3 in. The upper sashes are stationary and the bottom sashes are arranged to drop. Both platforms are furnished with two-leaf folding doors to which hinged steel guards are secured to cover the steps when the doors are closed.

The underframe consists of yellow pine side sills and oak end sills, both being reinforced by 4-in. x 6-in. steel angles. The cross-sills are of white oak, those which

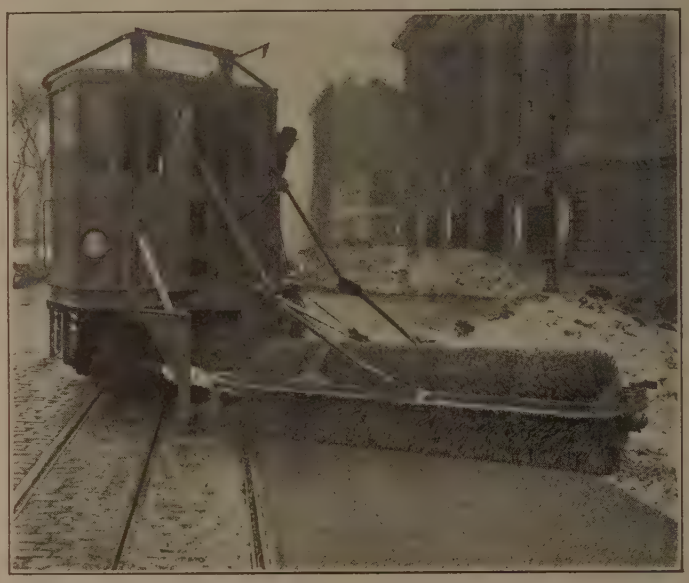
Vestibuled, Non-Bulkhead Car for Meridian, Miss.

carry the inner end of the platform knees being reinforced by steel plates which are bolted to the cross-sills and to the side sills. The truck sub-sill is of yellow pine reinforced by 5-in. 65-lb. channel, which is bolted to the sub-sill and the bottom framing. The body and roof framing are of white ash and oak. The side panels are sheathed with poplar but covered with No. 20 sheet steel. The roof is reinforced with a steel carlin at each side-post. The inside finish of the car is of white ash, natural color, while the ceilings are of three-ply maple veneer. Despite the short length of the car transverse seating six pairs of double seats is used principally and there are also four two-passenger corner seats, all made of birch slats.

OUTBOARD SNOW-SWEEPER FOR NEW YORK

The New York Railways Company during the last severe snowstorm placed in experimental service a novel sweeper broom which bids fair to solve the snow problem in New York. The situation in this city after a heavy snowstorm has become serious, owing to the rapid reduction in the number of horse-drawn vehicles available for carting away the snow, since the general introduction of the motor truck.

The railway companies which sweep the snow from their tracks are seriously handicapped in the first stages of a heavy snowfall because all vehicular traffic makes use of the street-car tracks and, in consequence, the surface cars are able to operate only at speeds of 2 m.p.h. or 3 m.p.h. The resulting loss in passenger



Out-Board Snow Sweeper in New York

receipts is enormous, it being stated that the New York Railways alone loses from $30,000 to $40,000 a day during the first week of any heavy snowstorm.

Owing to these conditions, the New York Railways has decided to install rotary brooms on its sweeper cars which will sweep not only the tracks but also the street for 12 ft. on each side of the track. In this way there will be provided a path for vehicles that is clear from snow and the vehicles can be kept off the tracks. The sweeper-broom as shown on the accompanying illustration is carried on a boom which swings outward from the track at an angle of about 45 deg. This angle may be changed as desired so that when the snow piles up at the gutters the angle may be decreased and more room left in which to pile the snow.

The trials of this new type of broom were so satisfactory during the last storm that the company has decided to rebuild all of its seventy-five sweeper cars. This number will provide one sweeper for each mile of double track, and as the speed of 7 m.p.h. is expected since the vehicular congestion will be decreased every part of the line will be swept once in nine minutes. As a result, the actual amount of snow to be picked up at each passage of the broom will be quite small.

The seventy-five sweepers now being equipped with this out-board broom are to be reconstructed so that the broom swings between the trucks instead of at the rear of the sweeper car as in the trial car. There will be a small house on the end of the boom and the broom-operator will be located in this. He will have control not only of the operation of the broom but also of the position of the boom so that he will be able to swing the broom back within the clearance limits of the sweeper car whenever necessary.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

New York.—Capitalization Value—Power of Public Service Commission to Increase Rates.

The stock corporation law (Consol. Laws 1909, Chap. 59), Sec. 55, permits stock to be issued for the value of property purchased and provides that, in the absence of fraud, the judgment of the directors as to the value shall be conclusive. Public Service Commission law (Consol. Laws 1910, Chap. 48), Sec. 55, requires that there must be an order of the commission authorizing the issue and stating that in the opinion of the commission the property to be paid for by the issuance of the stock is reasonably required for the necessary purpose of the corporation. A mortgage covering the property and franchises of a street railway company was foreclosed, and the purchaser, acting for the owner of most of the bonds secured, paid $912,000 for the property and franchises. The purchaser and associates filed certificates, required by the stock corporation law, Sec. 9, and formed a new corporation to take over the property and operate the railroad. The Public Service Commission, under the Public Service Commissions law, Sec. 55, refused to authorize the issue of bonds for the full amount of the purchase price because the property was not of that value. Held, that the capitalization was not restricted to the actual value of the property purchased, but when the good faith of the transaction was established the judgment of the directors was binding on the commission and the purchase price was the fair basis of capitalization.

Under the Public Service Commissions law (Consol. Laws 1910, Chap. 48), authorizing the commission to fix the value of corporate property, the commission should not have taken into consideration, in fixing the value of the property of a street railway company for the purpose of a stock issue, the fact that the property was weighed down by a 5-cent-fare franchise, as the power of the Public Service Commission to fix reasonable rates involves the right to increase as well as to lower, and the rates are to be reasonable to the public and reasonable to the corporation. (People ex rel. Westchester St. R. Co. et al. v. Public Service Commission for Second Dist. of New York et al., 143 N. Y., Sup., 148.)

New York.—Taxation—Assessment—Franchise Taxes.

In assessing a street railway company's special franchise for taxation, earnings and expenses incurred by the street railway in operating cars over another company's line should be disregarded.

Where a street railway company upon a proceeding to assess its franchise for taxation introduced evidence showing its property's depreciation, although the rule of a decision which then prevailed allowed credit for depreciation only on the sinking fund theory, the street railway company, on certiorari to review the assessment, may, the rule of decision having been reversed, claim credit for the actual amount of depreciation, this not being a change in its theory of action.

In assessing a street railway company's franchise, payments made to the city as rent for the use of streets and in accordance with the terms of the company's charter should be deducted.

In assessing a street railway company's franchise, the value of materials and supplies on hand which were necessary for the operation of the road may be included in the working capital on which the company is allowed a deduction.

In assessing a street railway company's franchise, the value of paving laid by it between the tracks should be considered, even though the company does not own the pavement, as it was compelled to lay it in constructing the line.

In assessing a tax on the street railway company's franchise, the cost of removing pipes and other obstructions which were removed when the company installed underground electric power should be considered.

In assessing a franchise, development and organization expenses consisting of promoter's profits, payment for legal services, and other services necessary to render the franchise of value must be excluded. (People ex rel. Metropolitan St. Ry. Co. v. State Board of Tax Com'rs, City of New York, Intervener, 144 N. Y., Supp. 74.)

North Carolina.—Eminent Domain—Condemnation of Land—Private Purpose.

Where a traction company had the power of eminent domain, not only by virtue of its charter, but expressly conferred by Revisal 1905, Sec. 1138, 2575, it was no objection to its exercise thereof that its charter also authorized it to engage in private business in addition to its authority to operate a street railway.

Where a traction company was also authorized to generate electricity for public use and had received the power of eminent domain by its charter and by general statute, it was no answer to its application to condemn land that it intended to use the same for private, as distinguished from public, purpose, since if, after acquiring the land for public use, it devoted it to a private purpose, such use could be terminated by quo warranto. (Wadsworth Land Co. v. Piedmont Traction Co. et al., 78 Southeastern Rep., 298.)

Virginia.—Charter Provision for Paving Not Revocable by Municipality.

Where the charter of a street railway company, incorporated by the State, provided that it should keep that portion of the street occupied by its tracks well paved and in good repair without expense to the municipality, those provisions were mandatory, and the city council could not shift any burden from the company to the municipality, any attempt to do so being ultra vires. (Norfolk & P. Traction Co. v. City of Norfolk, 78 Southeastern Rep., 546.)

Wisconsin.—Franchise Is Grant from State.

Under St. 1911, Sec. 1862, providing that any municipal corporation may grant to any street railway company the use of any of its streets for the purpose of laying tracks and running cars thereon, the municipality acts as the agent of the State, the franchise is a grant from the State, and the State alone can question its validity. Hence an action could not be maintained by a city to compel the removal of street car tracks from certain streets on the ground that the franchise was invalid, where the State, through the Attorney-General, declined to become a party. (City of Milwaukee v. Milwaukee Electric Ry. & Light Co., 144 N. E. Rep., 206.)

LIABILITY FOR NEGLIGENCE.

Alabama.—Collision with Team—Negligence from Speed.

Code 1907, Sec. 5476, which requires a railroad to acquit itself of negligence when stock or other property is injured on its tracks, does not apply to street railroads. In an action against a street railway for damages from a collision with a wagon and team the burden was upon the plaintiff to show not only negligence, of which the running of the car in excess of the speed limit was evidence, but also that such negligence was the proximate cause of the injury complained of. When he has done this, the defendant, who is seeking to escape liability on the ground of contributory negligence, must prove such contributory negligence.

The running of a street car in excess of the speed limit fixed by the city ordinance is negligence per se. (Montgomery Light & Traction Co. v. Riverside Co., 62 Southern Rep., 311.)

California.—Evidence of Intention to Stop from Signal.

Where the crew on an electric car gave the signal to stop, the jury, in considering the contributory negligence of a person struck by the car, might consider his right to rely on such signal rather than his observation, it appearing that the accident was at night and the headlight made such a blinding glare that the speed of the car could not be determined. (Simoneau v. Pacific Electric Ry. Co., 136 Pacific Rep., 544.)

Indiana.—Liability Notwithstanding Contributory Negligence of Plaintiff.

Where a motorman saw a pedestrian in a place of danger and could have avoided or mitigated the danger by the use of reasonable means at his command, the company was liable for the pedestrian's injuries, even though the pedestrian's negligence continued to the instant of his injury, since his negligence would not be contributory negligence, the active or proximate cause of the injury being the motorman's negligence. Hence it was proper to refuse an instruction that the pedestrian could not recover, even if the motorman was negligent, if his own negligence continued up to the time of his injury. (Indiana Union Traction Co. v. Kraemer, 102 N. E. Rep., 142.)

Kansas.—Injury to Alighting Passenger—Negligence—Presumption.

The mere fact that a passenger is upset by the motion in starting an electric car does not establish negligence in those operating it, as the movement may be one that is usual and incident to that means of transportation, but proof of an injury received by a passenger from the sudden and violent starting of a car as he was alighting therefrom is ground for an inference of negligence against the railway company. (Ewing v. Wichita Ry. & Light Co., 137 Pacific Rep., 940.)

Kansas.—Liability for Unsafe Stopping Points.

A street car company may be held responsible for negligence in stopping its car and inviting passengers to enter it at a place made dangerous by temporary repairs upon the street, although the work is being done by the city and the company has no control over it. (Haas v. Wichita R. & Light Co., 132 Pacific Rep., 195.)

Kentucky.—Verdict for Excessive Damages Not Disturbed.

A verdict for personal injuries will not be disturbed as excessive, though large, unless so entirely disproportionate to the injuries sustained that it must be the result of prejudice and passion. (South Covington & C. St. Ry. Co. v. Cahill, 152 S. W. Rep., 792.)

Louisiana.—Failure to Provide Sand Not Always Negligence.

A street railway company was not negligent in failing to provide sand to prevent cars from skidding or the wheels from slipping on wet rails where the use of sand had been tried and found ineffective because of the damp climate. (Wolf et al v. New Orleans Ry. & Light Co., 63 Southern Rep., 393.)

Louisiana.—Collision with Fire Apparatus.

While firemen and their apparatus have a right-of-way at a street railway crossing, in the case of collision with a street car the company will not be held liable in damages where the evidence tends to show that the motorman used ordinary care in discovering the approach of the fire apparatus and in endeavoring to avoid a collision and that the driver did not keep a proper lookout and did not slow up on approaching the street car tracks. In such a case where the evidence, as usual, is conflicting the verdict of a jury in favor of the defendant will not be disturbed unless clearly wrong on the facts. (Coles v. New Orleans Ry. & Light Co., 63 Southern Rep., 401.)

Louisiana.—Care Required from Driver of Vehicle.

The driver of a vehicle must take care not to drive so close to a moving car as to be struck by it, and, if it is necessary, he should drive into the gutter to avoid a position of danger. (Weiss v. New Orleans Ry. & Light Co., 62 Southern Rep., 216.)

Maine.—Master and Servant—Contributory Negligence.

Plaintiff, who was injured by running his motor car into freight cars which had been temporarily switched onto the main line, was guilty of contributory negligence, where he had an unobstructed view of the cars from 1500 ft. and 2000 ft., the greater part of which distance was on a straight line, though he testified that he was within 200 ft. of the cars when he first saw them, so that he could not stop in time to avoid a collision. (Paradis v. Lewiston, A. & W. St. Ry., 88 Atlantic Rep., 992.)

Maryland.—Injuries to Passenger Standing in Baggage Compartment—Jerks During Operation.

Where a passenger entering an electric car found all the seats taken and proceeded without invitation to the baggage compartment and there stood up, though he could have stood up in the passenger coach, and on a jerk of the car grabbed the door jamb, and the door, which was open, closed on his hand, injuring it, he is guilty of contributory negligence precluding recovery.

The court will take cognizance that electric cars do not run perfectly smoothly and that there are certain irregular movements to which they are subject. (Dawson v. Maryland Electric Rys. Co., 86 Atlantic Rep., 1042.)

Massachusetts.—Pedestrian at Corner Hit by Overhang—Company Not Liable.

Where plaintiff was struck by the overhang of a street car as it was rounding a curve, while she was going diagonally from one street corner to another, and it did not appear that the motorman had any knowledge that plaintiff was in dangerous proximity to the car or track, there was no proof of negligence. The motorman was not required to anticipate the approach of pedestrians from the rear or side of the car who might be injured by the overhang as the car rounded a curve. (Brightman v. Union St. Ry. Co., 103 N. E. Rep., 380.)

Massachusetts.—Negligence May Be Imputed to Child Six Years Old.

Where plaintiff's intestate, a child of six years, started to run across a track in front of a rapidly approaching street car in plain view, and so near that it struck her just as she got on the track, and there was nothing to obstruct her view or distract her attention, and the evidence failed to show that she used any care at all for her own safety, there could be no recovery, for even a child of tender years must use some care under such circumstances. (Walukewich v. Boston & N. St. Ry., 102 N. E. Rep., 311.)

Michigan.—Depression in Pavement.

A depression 12 in. square and of a maximum depth of 3 in., situated a step away from where a passenger would alight from a street car, was not an unsafe place for the landing of passengers. (Fuller v. Detroit United Ry., 142 N. W. Rep., 572.)

Minnesota.—Passenger in Baggage Compartment.

Plaintiff was injured while riding in the baggage compartment of one of defendant's cars. He was sitting in the doorway with his feet hanging outside. His feet came into contact with a platform of defendant. The train was overcrowded. There is evidence that defendant's trainmen directed passengers to ride in the baggage car, assented to their sitting in the doorway with their feet outside, took up tickets from them while so seated, and on one occasion cleared a place for them to sit in this manner. Held to be a question for the jury whether there was imposed on defendant a duty to warn passengers of the proximity of this platform to the track, and whether failure to give such warning was negligent. When a passenger carrier overcrowds its train beyond its seating capacity it is bound to exercise care proportionate to the increased danger caused by such overcrowding. The question of plaintiff's contributory negligence was also for the jury.

Where an act ordinarily negligent is done by a passenger upon the express or implied invitation of the employees in charge of the train the passenger will not as a rule be charged with contributory negligence as a matter of law. But the act of the passenger may be so obviously dangerous that even such invitation will not relieve him of contributory negligence. The act of plaintiff in this case was not so inherently dangerous that it can under all the circumstances be said to be negligent as a matter of law. (Shields v. Minneapolis, St. P., R. & D. Electric Traction Co., 144 N. W. Rep., 1092.)

New York.—Injury to Passenger While Passing from Platform to Inside of Car.

An elevated railway company stopping a car to discharge and receive passengers need not delay starting the car until a passenger in normal physical condition is seated, but the conductor may give the starting signals after the passenger is fully on the car, and a female passenger sixty-five years old who is not suffering from any disability is within the rule and may not recover for an injury sustained by the starting of the car before she had time to enter the door of the car from the vestibule. (Martin v. Boston Elevated Ry. Co., 103 N. E. Rep., 828.)

Pennsylvania.—Contributory Negligence of Driver of Vehicle.

Where a person driving at a slow trot on a street running at right angles to a street upon which a street car line was operated was injured from a collision between his horse and a street car, and he had an uninterrupted view from the direction in which the car came for 350 ft., he was guilty of contributory negligence as a matter of law. (Shope v. Central Pennsylvania Traction Co., 88 Atlantic Rep., 920.)

Pennsylvania.—Injury by Fender.

Where a woman steps in front of a street car which she knows is approaching and is injured, her contributory negligence bars any recovery, whether she was struck when she stepped on the track or by the fender before she came to the track. (Underwood v. Pittsburgh Rys. Co., 86 Atlantic Rep., 184.)

News of Electric Railways

Proposal for Temporary Operation at Three Cents in Toledo

At the meeting of the special street railway committee of the City Council at Toledo, Ohio, on April 4, Henry L. Doherty, acting for the Toledo Railways & Light Company, suggested that the city grant the company a twenty-five-year franchise, with the fare for the first year fixed at five tickets for 15 cents or 5 cents in cash, to determine whether or not such rate is adequate. Mr. Doherty offered to have the attorneys for the company prepare a franchise ordinance along these lines, and on April 7 it was announced that the company would present the proposed tentative ordinance at the meeting of the franchise committee of the Council on April 9.

The street railway committee did not heed Mr. Doherty's request on April 4 to operate at the regular fare. In consequence the company has adhered to the policy referred to in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, of carrying free all passengers who refused to pay the regular rates. Except among those connected with the city administration the general disposition of the patrons is to pay the regular fare. In the plea which he entered for the company on April 4, Mr. Doherty said that, in reality, the low fare should not begin until the routes are rearranged and new cars secured, as the property was now not in the best shape for giving the most favorable results.

An ordinance of the kind suggested by Mr. Doherty would provide that the rate of fare should be fixed after one year so as to insure an adequate return to the company and that it should be modified at the end of each five-year period thereafter, if found necessary. Mr. Doherty told the committee that, if the proposition was taken under consideration, he would remain in Toledo and give the franchise matter his undivided attention until a final agreement was reached. The proposal for trial operation for a year was made, Mr. Doherty said, because a certain faction in the city could not be convinced without an actual physical test that operation at the 3-cent fare was unprofitable. He contended that the fact that 85 per cent of the people using the cars pay the regular fare rather than ride free indicated that the patrons of the company were not in favor of the adoption of confiscatory methods.

Assistant City Solicitor John Schlatter expressed the belief that the request made by Mr. Doherty could not be granted without repealing the Schreiber ordinance. Mr. Doherty said he did not ask for the repeal of the ordinance now, but if negotiations were opened along the line of his suggestion, he desired that the company be allowed to operate at the regular fare until an agreement had been reached.

On April 6 City Solicitor Thurstin said that his office was so busy with routine matters that the force could not give proper attention to the case against the company in the common pleas court for the collection of $250 a day rental from the Toledo Railways & Light Company for the use of streets on which franchises have expired. He desired an appropriation of $10,000 to defray the expense of engaging special counsel to assist him in the case against the company. It was the intention of Mr. Thurstin to file a petition on April 6 asking for an injunction to restrain the company from collecting more than a 3-cent fare and from selling tickets at the rate of six for 25 cents, but he concluded to await the action of Council on his request for funds for the employment of additional counsel.

Mr. Doherty has made a formal proposal to the City Council that the decision of Federal Judge Killits in the recent injunction case be referred back to Judge Killits himself for interpretation. Mr. Doherty's letter was referred to the franchise committee of the Council. He said in part:

"Immediately upon receipt of Judge Killits' opinion last Monday evening, we prepared an epitome of it which we submitted to your honorable body so that objections might be made if our statement should in any way seem to give an unfair interpretation of his opinion. This communication was received, read and referred to the committee. Two members of the staff of the city solicitor were present when it was read and no objection was raised. We were quite surprised later to learn from the newspapers that the city solicitor charged that a misstatement had been made regarding the purport of Judge Killits' opinion. It does not seem possible to us that there can be any different interpretation of Judge Killits' opinion than that given by us. Judge Killits said:

"'That the company may run its cars day by day without the city's consent and charge fare because its service is a public necessity; it may charge a rate that will pay its expense of operation, including proper maintenance charges, and a fair return for the use of the investment.'

"We request your honorable body either to concur in our interpretation of this matter or to take the necessary steps to clear up an unwarranted confusion, and promise our cooperation to this end. We urge that you instruct your city solicitor to prepare a distinct statement as to his interpretation of Judge Killits' opinion and that you further instruct him that if his interpretation differs from ours that he should join us in asking Judge Killits to decide which of us is right in interpretation."

Arbitration Hearings Closed at Northampton

Closing arguments in the Northampton (Mass.) Street Railway wage case were heard by the arbitration board on April 3. On behalf of the men it was urged that wages should be increased on account of the rising cost of living and the strong financial condition of the company, its favorable accident record and progressive management. The sliding scale was criticised and citations of wage rates on other roads questioned at length. It was contended that high individual yearly earnings were largely due to overtime work.

E. L. Shaw, for the company, said that in his opinion the men had not made out a case. The feeling that one was working for less than adequate compensation was common to human beings everywhere. The investors in the company's stock had received less than a savings bank return on their money during the last five years, and when some $300,000 of the road's bonds became due the present security holders had to buy the new stock issued to meet this obligation. The evidence of L. F. Babbitt, purchasing agent of the Northampton state hospital, that the cost of supplies had decreased 9 per cent in the past year, was a direct indication that the cost of living was falling.

Mr. Shaw pointed out that the company has raised wages 44 per cent since 1897, while the men urged that the cost of living had risen 24 per cent in this period. The increases amounted to from $150 to $250 per man on the year's wages. The men in the maintenance department of the company were exceptionally well paid, one lineman receiving $1,039 for the year. If these men had testified before the board much evidence would have appeared showing the liberality of the company's compensation. Regarding platform wages, Mr. Shaw said that although the hourly rates on the basis of a ten-hour day were 21 cents the first year and 26 cents the sixth year, and later a full day was allowed for nine and one-half hours' work, and on this basis the hourly rates are 22.1 to 27.36 cents. The men asked for $2.50 a day for the first six months' service, $2.75 for the second six months, and $3 per day thereafter. As the statutes require a day's work of nine hours to be completed in eleven this would mean a wage scale of from 27.77 to 33.33 cents. The present financial condition of the company made an increase in wages impossible. During the last five years the operating expenses and taxes had increased in greater proportion than the gross receipts. In 1909 the employees received 48 per cent of the operating expenses and in 1913 57 per cent. The average rate of dividend paid by the company did not exceed 6 per cent in the past twenty-one years. The company was able to secure all the men it needed at the present wage scale, many men from other crafts being attracted to the service on account of the steady work afforded. The company felt that while a man could be taught to handle a car and collect fares in a short time, the development of "railroad sense" and the ability to deal with the public were matters that required time and made a man more

valuable as the years went by. The average rate of wages paid by the company was only 7.5 mills less per hour than the average of nineteen street railways in Massachusetts, and was exactly the same as that paid by nine companies which had less than 50 miles of track.

New Haven Electrification

So far as engineering and construction experience can indicate, the overhead contact and distribution system of the New York, New Haven & Hartford Railroad between New York and New Haven, it is believed, will be completed by June 1. Electric freight, passenger and switching service can then be established between New York and New Haven. The extent of this service is dependent upon the electrical output of the power house at Cos Cob, Conn. Exactly to what extent trains will be operated by electricity upon the completion of the work now in progress it is difficult to state. The trains to be operated in this manner after that date will naturally be arranged so as to secure the greatest electric movement consistent with the normal output of electricity from the Cos Cob power station of the company.

The original electrification of the New Haven road between Stamford and Woodlawn, begun in 1905 and completed in 1907, embraced 21½ miles of route and 110 miles of single track. As the New York Central & Hudson River Railroad had the year previous electrified its track from the Grand Central station to Woodlawn, where the junction with the New Haven tracks is made, a distance of 12 miles, this made the total route distance for the New Haven company's original electric service between the Grand Central Station and Stamford 33 miles.

After a considerable experience with the electric service between these points it was decided to electrify the six-track Harlem River Branch, connecting Harlem River with the main line at New Rochelle, and subsequently to extend the electrification of the road east from Stamford to New Haven. In these plans the final object in mind was the putting of all passenger, freight and switching service upon an electric basis. With this end in view appropriations were made for an addition to the electrical output of the Cos Cob station, for additions to the main line, yards and siding electrification and for additional locomotives of the freight and switching type. Heavy expenditures were required elsewhere on the property and for this reason it became necessary to forego the building of power plants required at the eastern and western extremities of the electrification zone. The increase made in the output of the Cos Cob power plant, as provided for in these appropriations, would permit of a very large percentage of complete electric service as soon as the overhead contact and distribution system is ready. It will not, however, permit of 100 per cent of electric service until the eastern and western plants shall have been provided. Complete electric operation therefore will be delayed until suitable arrangements for additional power and electric locomotives can be obtained.

Subsidies Sought for Radial Electric Railways in Canada

On March 26, 1914, the representatives of the Canadian government at Ottawa received a deputation of about 1500 public and private citizens from Western Ontario who waited on Premier Borden and his Ministers to urge Dominion aid for the projected provincial radial railway system and the improvement of the Welland and St. Lawrence artificial waterways. Four memorials were read, among them the hydro-radial memorial, presented in behalf of 250 municipalities, for a federal subsidy of $6,400 a mile for such electric railways as may be recommended to be constructed by the hydro-electric commissioners. Premier Borden pointed out that the proposals were many and had not been received by the government in advance. In the circumstances, he could only promise consideration by himself and his colleagues.

Thomas Marshall, Monck, Ont., has presented a resolution in the Ontario Legislature to require the Canadian government to help the municipalities of Ontario by granting a subsidy to the hydro-electric radial railways to provide for their construction.

Strike on Kansas Interurban Line.

The lines of the Union Traction Company, which operates between Coffeyville, Independence, Cherryvale and Parsons, Kan., and in Coffeyville and Independence, were tied up for a short time on March 31, when all but twelve motormen and conductors went on strike. Crippled service, however, was maintained for the remainder of the day. Linemen, men who had been trained in anticipation of the walkout, and the regular carmen who refused to leave their work manned the cars on the following day, and the full schedule was resumed. On April 2 and 3, the company had the situation well in hand. The men who went on strike demanded higher wages, shorter hours, establishment of the seniority rule and recognition of the union. The strike was precipitated, however, by the discharge of three men. The crews demanded reinstatement, an explanation, or both. The Union Traction Company's officials refused both demands and the walkout followed. Little trouble marked the strike, the fifty disgruntled men contenting themselves with hooting the new employees. On April 2 a committee of the strikers visited the city commissioners of Independence. D. H. Siggins, president and general manager, represented the company. The commissioners took the attitude that they had a right, as custodians of the public safety, to inquire as to whether competent men were being used on the cars. Mr. Siggins asked them to present the matter in writing.

Referendum Vote Defeats Chicago's Comprehensive Subway

At the biennial aldermanic election held in Chicago on April 8 the proposed comprehensive subway system was defeated. Prior to the election an ordinance had been prepared and bids had been asked on the detailed plans and specifications. This request for bids was widely advertised, but nothing came of it except some counter propositions made by little-known interests. The majority against the subway scheme was about 150,000. It had been shown clearly before the election that it was impossible under the existing state laws governing franchises to induce private capital to finance the comprehensive subway system. The vote is taken to indicate that the public would favorably consider the initial subway plan submitted by Bion J. Arnold and the Board of Supervising Engineers.

State Co-operation Proposed in Rhode Island

James M. Scott, James Harris, and George M. Thornton have been suggested as members of a commission to work in conjunction with the trustees to be appointed for the Rhode Island Company, in a resolution which was introduced in the Rhode Island Legislature on April 8 by Representative David J. White of East Greenwich. In explaining the reason for the introduction of his resolution Mr. White declared that Rhode Island capital should be used to purchase the roads. He said in part:

"The total number of shares of stock of the New York, New Haven & Hartford Railroad, held in Rhode Island is 47,270. The number of shares held by individuals is 26,034; held by trustees, 7877; trust companies, 6020; insurance companies, 2495; real estate companies, 1100; hospitals, 850. The remainder is held by banks, estates and guardians. My purpose in introducing this resolution is to establish a commission clothed with authority by the General Assembly of this State to stand between the stockholders of the New York, New Haven & Hartford Railroad and its kindred interests, and prevent further harm to them."

The Ohio Valuations

In requiring public utility companies to file appraisals of their property with it by Aug. 1, the desire of the Ohio Public Utilities Commission has been merely to secure means of obtaining information to guide its representatives in their work. An extension of time for filing the appraisals will be granted where it can be shown that the work cannot be completed within the time named. The appraisals are to show the value as of July 1. E. W. Doty, a member of the commission, says it is not alone the reproduction value that is required, nor is this the main element, but that the appraisal, rather, is to be historical and analytical.

Snow Removal Responsibility Fixed.—Judge Winchester of Toronto, Ont., in passing upon the differences between the officials of the city and the officers of the Toronto Railway over the question of snow removal, said that it was the duty of the Toronto Railway to remove the snow, as required by the city engineer.

Work Begun on Third-Tracking New York Elevated Lines.—The T. A. Gillespie Company has begun work on its contract with the Interborough Rapid Transit Company for the third-tracking of the Third Avenue elevated railroad in Manhattan. A third track is to be added to this line as well as to the Second Avenue and Ninth Avenue elevated railroads.

Franchise Sustained.—On March 30, 1914, Common Pleas Judge Garver rendered a decision holding that the twenty-five year franchise granted to the Lake Shore Electric Railway by the Council of Fremont is operative and that the referendum petitions filed by the Municipal League are illegal because they were filed with the clerk of the Council instead of with the board of elections.

Steinway Tunnel Assigned to City.—The Board of Estimate of New York has authorized Mayor Mitchel to receive on behalf of the city the deed and assignment of the Steinway tunnel from the Interborough Rapid Transit Company. It has also adopted the report of the comptroller on the contract for the reconstruction of the tunnel for temporary operation. The Steinway tunnel was built by a private corporation at a cost of $8,000,000. The city has taken it over at a cost of $3,000,000 and will operate it as a part of the dual system of subways.

Progress of Pittsburgh Subway Ordinance.—The Pittsburgh City Council was informed on March 31, 1914, by Assistant City Solicitor C. K. Robinson that he had been visited by a representative of New York capitalists who requested that their syndicate be kept informed as to the developments in the Council's action on the new subway ordinance. The measure has been amended by striking out the provision that the company must get the consent of the Council to change the rate of fare and inserting a clause that a rate of 5 cents shall prevail within the city limits.

Suit Against Chicago Railways Dismissed.—In April, 1913, J. B. Hogarth, formerly a division superintendent of the Chicago (Ill.) Railways, filed suit in the Circuit Court for $2,500,000, naming as defendants Henry A. Blair, Samuel Insull, Ira M. Cobe, Frank A. Vanderlip and Samuel McRoberts. Mr. Hogarth sought to recover one-half of a promotion fund which he declared was to have been divided equally between himself and Henry A. Blair, who was then chairman of the board of directors of the Chicago Railways. Judge Baldwin dismissed this suit on March 26, 1914.

Bids for Subway Section in New York.—Bids have been called for by the Public Service Commission for the First District of New York to be opened on April 24 for the construction of Section No. 2 of Routes Nos. 4 and 36, the Broadway subway in Manhattan, for operation by the New York Municipal Railway Corporation. This subway is already under construction from the lower part of Manhattan to Broadway and Twenty-sixth Street. Section No. 2 extends under Broadway from Twenty-sixth Street to about Thirty-eighth Street. On this section there will be a local station at Twenty-eighth Street and an express station at Thirty-fourth Street.

Akron Agreement to Be Signed Soon.—Delos F. Wilcox of New York has been retained by the Intercity Traction League to investigate conditions on the various lines of the Northern Ohio Traction & Light Company. The league is a voluntary organization, made up of the representatives of the people of the various towns and cities through which the company operates. It is said that the agreement between the city of Akron and the Northern Ohio Traction & Light Company will be signed soon. In accordance with the agreement, the company will withdraw the suit through which it sought to prevent the city from taking its water supply from the Cuyahoga River, and on the other hand the city will pay the company $248,000, due on a contract.

Chicago's Traction Fund.—The traction fund of Chicago, Ill., comprising 55 per cent of the net receipts of the surface railways, will amount to $2,831,912 for the year 1913, according to figures compiled at the comptroller's office. An advance payment of $1,000,000 has been received by the city in the form of two certified checks, one for $600,000 from the Chicago Railways, the other for $400,000 from the Chicago City Railway. Last year the city's share of the receipts was $2,529,033, of which $1,412,870 was contributed by the Chicago Railways and $1,116,163 by the City Railway. According to City Comptroller Traeger the total deposited in the fund, plus accrued interest, Dec. 31, 1913, was $11,018,146, out of which $145,083 has been expended.

Operating Agreement Signed in Tacoma.—The agreement between the city of Tacoma, Wash., and the Tacoma Railway & Power Company for the operation of the railway to the tideflats has been signed by L. H. Bean as general manager for the company and Mayor Seymour for the municipality. The $35,000 of municipal bonds will now be sold and the line constructed. The agreement provides for a lease of the city owned tracks to the company to run for 7½ years. The company is to pay the city 4 per cent on the investment and one half of the proceeds after the company has been allowed six per cent on its investment. Transfers will be issued between the tideflats line and the other lines operated by the Tacoma Railway & Power Company.

Plans for Opening Seattle Municipal Line.—The section of Seattle's municipal railway known as Division A extending from Third Avenue and Pike Street to Salmon Bay at Thirteenth Avenue West and Nickerson Street is expected to be ready for operation by May 1, 1914. Division "A," as the first unit of a municipal line to extend the full length of the Rainier Valley will be known, represents an investment of about $490,000, from a bond issue of $800,000 authorized by the voters three years ago. Twelve cars have been delivered. Oliver T. Erickson recently introduced a resolution in the Council authorizing the Board of Public Works to prepare plans and specifications for the construction of Division "B" of the municipal railway system. The plan anticipates a physical connection between Division "A" and Division "B."

Injunction to Restrain Construction of Cleveland Crosstown Line.—William J. Ward and C. A. Fagan, as taxpayers, have filed an injunction suit in common pleas court to prevent the Cleveland Railway from proceeding with the construction of a crosstown line on East Seventy-ninth Street. William J. Springborn, director of public service, is made a party defendant in the suit. The petition states that the franchise to build the line was passed on March 16, 1914, and that the forty days necessary to elapse before it becomes operative under the new charter have not yet passed. It further states that an effort is being made to secure a referendum vote, but that construction work is proceeding steadily on the line during the time that it was intended there should be no action on the part of the company so as to permit action to secure a referendum.

Monorail Line Dismantled.—Thomas W. Whittle, park commissioner of the Bronx, was authorized by the Board of Estimate of New York at a recent meeting to hire vehicles in which to carry passengers for a 5-cent fare over the route of the Pelham Park & City Island Railroad, a monorail line. The board also ordered that no more time should be granted to the monorail company, and instructed Mr. Whittle to see that the company's property was removed. Mr. Whittle obtained vehicles, and on March 21, the day after the resolutions were adopted by the board, started in to provide transportation. Horse-drawn buses were used the first few days. These were replaced by gasoline vehicles, and now three automobile buses are being run. The rails of the monorail line have been removed. Commissioner Whittle has been instructed by the Board of Estimate to submit a report on City Island transportation.

Meeting to Consider Proposed Missouri Accounts Classification.—A meeting of the members of the Missouri Association of Electric, Gas, Street Railway & Water Works Association was held in St. Louis on April 1, with Philip J. Kealy, of the Kansas City Railway & Light Company, presiding, for the purpose of considering the tentative classification accounts proposed by the Missouri Public Utilities Commission, and affecting all of the utilities of the State, with the exception of electric railways. Classifications for this branch of public service corporations have not yet been announced. About fifty members were present.

Resolutions were adopted making it the sense of the meeting that the date of the hearing on the questions involved be changed from April 15 to a later date, that those principally affected might have time to study the details of the issues involved. Another resolution, asking that the new classifications be withheld from commission until at least Jan. 1, 1915, was adopted.

Extension of Time for Construction Granted.—Two months' extension of time has been granted to the Hudson & Manhattan Railroad in which to begin the construction of the extension of its present line from Thirty-third Street and Sixth Avenue, New York, N. Y., to the Grand Central Station. The franchise provided that the company should actually begin digging within six months of the filing of the consents of the property owners. These were duly filed on April 28, 1910, and since then various extensions of time have been allowed the company, the last expiring on April 28. As far as possible it is the desire of both the Public Service Commission and the company to have the construction necessary at both Thirty-third Street and Sixth Avenue and at the Grand Central Station on the Hudson & Manhattan Railroad proceed simultaneously with the other subway work at these points, and so far the plans of the Interborough Rapid Transit Company at the Grand Central are not finished.

Kansas City Ordinance Vetoed.—Mayor Jost, of Kansas City, recently vetoed the ordinance providing for the construction of street railway lines on Twenty-fourth Street between Broadway and Main Street. The Mayor was advised by the city counselor that the Council has no power to grant such a franchise unless written consents were obtained from the owners of most of the frontage property. The Terminal company, which owns most of the property referred to, would not give its consent. Mayor Jost made this clear in a letter to the Council, in which he said in part: "The problem of routing cars to the Union Station should be taken up and handled in a practical way and the entire work provided for in one grant. I have heretofore expressed the opinion that it is unwise to make any such valuable grants so long as the street railway properties are in the hands of the federal court, and it is beyond the power of the State and of the city to regulate and control the same, and I still incline to that opinion. In order that the views of Federal Judge Hook, who has charge of this property through his receivers, may be obtained in regard to this whole matter, I have signed Ordinance No. 19,154 providing for a track on Broadway from Fourteenth Street to Southwest Boulevard, which is a link in the plan as I think it should be worked out." Mayor Jost's veto was sustained by the Council.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

NEW YORK

Governor Glynn has approved the measure to amend the public service commissions law in relation to the free transportation by common carrier of mail carriers in uniform. The Healy bill authorizing the Public Service Commissions to suspend new rate schedules filed by public utilities corporations, pending their determination as to the reasonableness of the increases, has been signed by Governor Glynn. The Governor has also approved the Pollock bill amending the general corporation law by providing that the existence of an easement in real property acquired or reserved by a municipal railroad or other transportation corporation shall not be deemed an encumbrance under any law relating to investments and mortgages on real property, but effect of such an easement shall be taken into consideration in determining the value of property. The Governor has announced that he will veto the Coates-Maier bill designed to have the holdings of minority stockholders in cases of railroad consolidation valued by appraisers appointed by the Supreme Court.

Governor Glynn has signed the Senate bill authorizing the Public Service Commission of the First District to enter into contracts for installing and operating telephones in the subways, the contracts to be subject to termination at the discretion of the commission. He has also signed the act to amend the public service commission law in relation to the issue of stocks by railroad and street railways.

Financial and Corporate

Stock and Money Markets

April 8, 1914.

The general level of the prices of the securities dealt in on the New York Stock Exchange to-day, instead of improving, lost about three times the small gain which had been made during the preceding three days of trading. Dealings increased considerably in volume, but this expansion occurred only under increased selling pressure. Railway and other bonds were irregular. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ @ 2¾ per cent; four months, 2¾ @ 3 per cent; six months, 2¾ @ 3 per cent.

On the Philadelphia Exchange to-day trading was light and lower levels were established.

The Chicago market was broad and steady to-day. Chicago Railways issues were in demand, series 1, 2, 3 and 4 all being dealt in. The bond transactions totaled $29,000, par value.

The Boston market to-day was dull and somewhat irregular, but rather easier in tone.

The active issue in the trading in Baltimore to-day was United Railways & Electric stock. The bond transactions totaled $38,100, par value.

Quotations of traction and manufacturing securities as compared with last week follow:

	Apr. 1	Apr. 8
American Brake Shoe & Foundry (com.)	88½	88½
American Brake Shoe & Foundry (pref.)	139	139
American Cities Company (com.)	36	35¾
American Cities Company (pref.)	63½	62
American Light & Traction Company (com.)	367	365
American Light & Traction Company (pref.)	107	107
American Railways Company	38	37½
Aurora, Elgin & Chicago Railroad (com.)	42	41
Aurora, Elgin & Chicago Railroad (pref.)	78	77
Boston Elevated Railway	82	81
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	63	*63
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	37	37
Brooklyn Rapid Transit Company	92⅜	92⅛
Capital Traction Company, Washington	104¼	101
Chicago City Railway	a170	145
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	65
Chicago Railways, ptcptg., ctf. 1	90	90½
Chicago Railways, ptcptg., ctf. 2	30	32
Chicago Railways, ptcptg., ctf. 3	6	6
Chicago Railways, ptcptg., ctf. 4	2½	2
Cincinnati Street Railway	105	105
Cleveland Railway	104½	103
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*23	a23
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53½	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	71	*71
Detroit United Railway	a80	a80
General Electric Company	147	146
Georgia Railway & Electric Company (com.)	121	120¼
Georgia Railway & Electric Company (pref.)	85¾	88
Interborough-Metropolitan Company (com.)	15⅛	15¼
Interborough-Metropolitan Company (pref.)	60⅜	61½
International Traction Company (com.)	*30	80
International Traction Company (pref.)	*85	a85
Kansas City Railway & Light Company (com.)	*10	15
Kansas City Railway & Light Company (pref.)	*25	35
Lake Shore Electric Railway (com.)	*5½	5
Lake Shore Electric Railway (1st pref.)	*85	92
Lake Shore Electric Railway (2d pref.)	*22	22
Manhattan Railway	130	130
Massachusetts Electric Companies (com.)	11	11
Massachusetts Electric Companies (pref.)	61½	61
Milwaukee Electric Ry. & Light Co. (pref.)	*95	95
Norfolk Railway & Light Company	25¼	25¾
North American Company	78½	76⅞
Northern Ohio Traction & Light Co. (com.)	70	58
Northern Ohio Traction & Light Co. (pref.)	101	101
Philadelphia Company, Pittsburgh (com.)	42½	41⅛
Philadelphia Company, Pittsburgh (pref.)	40	40
Philadelphia Rapid Transit Company	17½	16⅝
Portland Railway, Light & Power Company	*54	51
Public Service Corporation	112	113
Third Avenue Railway, New York	43½	43½
Toledo Traction, Light & Power Co. (com.)	a20	20
Toledo Traction, Light & Power Co. (pref.)	a70	70
Twin City Rapid Transit Co., Min'apolis (com.)	104⅝	104
Union Traction Company of Indiana (com.)	*11½	11½
Union Traction Company of Indiana (1st pref.)	*80	75
Union Traction Company of Indiana (2d pref.)	*14	14
United Rys. & Electric Company (Baltimore)	27	27
United Rys. Inv. Company (com.)	20	18
United Rys. Inv. Company (pref.)	48	44
Virginia Railway & Power Company (com.)	50	51¼
Virginia Railway & Power Company (pref.)	96	96
Washington Ry. & Electric Company (com.)	87⅝	88½
Washington Ry. & Electric Company (pref.)	87	86½
West End Street Railway, Boston (com.)	71	70
West End Street Railway, Boston (pref.)	92	91
Westinghouse Elec. & Mfg. Company	75	74⅜
Westinghouse Elec. & Mfg. Co. (1st pref.)	119	118

* Last sale. a Asked.

ANNUAL REPORTS

Public Service Corporation of New Jersey

The combined results of operation of the Public Service Corporation of New Jersey, Newark, N. J., and subsidiary companies for the year ending Dec. 31, 1913, are shown by the following statement:

Operating revenue of subsidiary companies	$34,592,473
Operating expenses and taxes	$18,844,608
Amortization charges	1,007,590
Total	$19,852,198
	$14,740,275
Non-operating income	377,972
P. S. C. income from securities pledged and from miscellaneous sources	2,308,874
	$17,427,121
Income deductions of subsidiary companies (bonded interest, rentals and miscellaneous interest charges)	11,911,316
	$5,515,805
P. S. C. income deductions:	
Interest on perpetual interest-bearing certificates	$1,202,026
Interest on P. S. C. general mortgage 5 per cent bonds	1,598,143
Interest on miscellaneous obligations	155,589
Amortization of debt, discount and expense	102,348
Sinking fund for P. S. C. general mortgage 5 per cent bonds	209,500
Total	$3,267,606
Net income	$2,248,199
Appropriation accounts of subsidiary companies:	
Additional amortization of capital	$368,719
Amortization of new business expenditures prior to Jan. 1, 1911	40,330
Adjustments of surplus account	80,585
Total	$489,634
	$1,758,565
P. S. C. appropriation accounts:	
Sinking fund accruals applicable to 1912	$52,375
Adjustments of surplus account	20,249
	$72,624
Net increase in surplus	$1,685,941

Dividends at the rate of 6 per cent per annum aggregating $1,500,000 were paid during the year. According to the report the net increase in surplus after the payment of dividends of only $185,950 was caused by the large amount set aside for amortization charges during 1913, this being $1,376,309, as compared with $722,078 in 1912. If the amount of $261,875 set aside for the sinking fund is included, the grand total for the year for amortization of properties and redemption of all securities amounted to $1,638,185.

Operating revenues of the subsidiary companies increased $2,123,072 during 1913, but this figure includes in operating revenue certain items which under the system of accounts in effect for gas and electric companies prior to Jan. 1, 1913, were treated as deductions from operating expenses. The increase in operating revenues and non-operating income of the subsidiary companies is shown by the following comparative figures: Electric properties in 1912, $7,582,373; in 1913, $8,545,845; gas properties in 1912, $9,809,607; in 1913, $10,222,668; railway properties in 1912, $15,262,426; in 1913, $16,201,932. The miscellaneous income of the Public Service Corporation increased from $1,939,338 in 1912 to $2,308,873 in 1913, giving a total increase from $34,593,804 in 1912 to $37,279,319 in 1913. The increase in the operating revenue of the railway properties was 5.5 per cent. The total passengers carried increased to the same extent.

The taxes paid during 1913 amounted to $2,062,982, an increase over 1912 of $189,963. The fire insurance carried as of Dec. 31, 1913, amounted to $28,209,751. This was an increase over the preceding period of the previous year of $1,349,082, but the premiums for 1913 actually decreased to the extent of $10,299 and the rate per $100 of insurance decreased from 44 per cent in 1912 to 38.3 cents for 1913.

During the year the company expended $65,478 for welfare work, as compared with $61,116 in 1912. The cost of accidents arising under the employer's liability act was $56,421. This amount was made up of total payments provided by the act amounting to $37,335, additional compensation paid under the authority of the welfare committee amounting to $10,525 and departmental expenses of $8,560. The accident account of the railway properties, including the cost of operation of the claim department, absorbed 4.15 per cent of the passenger receipts as against 4.32 per cent for 1912.

In regard to the voluntary wage scale which the railway properties put into effect as of Jan. 1, 1914, the report states that during 1914 this will involve an increase of the expenditure of approximately $200,000, which is believed to be the largest single increase in the pay of trainmen ever put into effect at one time by any electric railway company in this country.

During the year the total number of prepayment cars in service upon the system was brought up to 1156. In track work, 42.2 miles were reconstructed and 14.6 miles of track extensions were completed. The most important improvement completed during the year was the construction of the road between Elizabeth and Metuchen which, together with the reconstruction of the old Trenton & New Brunswick property, made a complete trans-state line. During the year the company continued its policy of building permanent homes for its subsidiary companies in the various centers of their activities. Office additions and improvements were made at Trenton, Elizabeth and Montclair and sites were acquired in Hackensack, Passaic and Hoboken for the construction of offices. In regard to what the company considers the most comprehensive development in its history—namely, the construction of the modern combination street railway terminal and office building in Newark—it is stated that with the recent approval of the necessary ordinances the company intends to push the work rapidly so that the entire project may be completed not later than Jan. 1, 1917.

Louisville Railway

The statement of income, profit and loss of the Louisville (Ky.) Railway for the fiscal year ended Dec. 31, 1913, is as follows:

Passenger revenue, city lines	$3,090,654
Revenue for mail and advertising	18,349
Net revenue from interurban lines and interest	196,815
Income from other sources	117,272
Gross earnings	$3,423,090
Operating expenses, including maintenance	1,848,518
Net income from operations	$1,574,572
Deduct:	
State, county and city taxes	266,259
Interest to date paid and accrued	585,834
Total deductions	$852,093
Net income	$722,479
Dividend on preferred stock	$125,000
Dividend on common stock	545,660
Accident fund	36,496
Total	$707,156
Surplus for period	$15,323

The report states that improvements made during 1913 were of such a varied character that only the more important ones could be referred to. Attention is then called to the new powerhouse installed at Twentieth and High Streets, the extension of the conduit system, the almost completed building of new car shops at Twenty-ninth Street and various track renewals and installations.

The company built in its own shops ten new trail cars of the center entrance type. These, it is stated, have been in operation for the past three months and have proved very popular with the public.

South Carolina Light, Power & Railways Company

The statement of income, profit and loss of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., for the year ended Dec. 31, 1913, follows:

Gross earnings	$375,306
Operating expenses	127,613
Net earnings	$247,693
Taxes	15,376
Balance	$232,316
Interest on funded debt	150,000
Balance	$82,316
Dividends on preferred stock	30,000
Surplus	$52,316

Comparing the earnings shown by the above statement with those for the year 1912 of the predecessor companies of the South Carolina Light, Power & Railways Company,

there is noted an increase in gross earnings of 10.5 per cent, while net earnings increased 8.5 per cent. The report of the company calls attention to the fact that it enjoys a great diversity of income, evidenced by the fact that about 55 per cent of its income is derived from the operation of various public utilities, 30 per cent from the sale of power to cotton mills and 15 per cent from other manufactories.

During the year 1913, general additions were made to the power plant, gas plant and street railway system at a cost of $179,446. The principal improvements to the railway department were the construction and reconstruction of track, the construction of new pavements and additions to the carhouse, the building of a machine shop, the purchase of five new cars and the rebuilding and repainting of fifteen old cars, as well as the equipping of both old and new with new double equipment Consolidated car fenders.

The report says that "in addition to making these important improvements a liberal outlay was made for maintenance, so that the properties of the company are in first-class operating condition." No detailed analysis is given in the report, however, to show what proportion of the operating expenses consisted of maintenance charges.

United Power & Transportation Company

The statement of earnings of the United Power & Transportation Company, Camden, N. J., for the fiscal year ended Dec. 31, 1913, is as follows:

Credits:		
Income from dividends, interest, loans, etc.....		$784,698
Debits:		
Expense account (interest on notes, etc.)..	$29,773	
Taxes	3,296	
Payments on United Railways gold trust certificates	316,720	
Payments on Delaware County gold trust certificates	39,956	389,745
Surplus for 1913 after paying fixed charges.....		$394,952
Balance to credit of profit and loss, Dec. 31, 1912.....		1,289,391
		$1,684,343
Adjustments during 1913, credit to profit and loss....		97,814
		$1,782,157
Dividend paid July 31, 1913.....$181,125		
Dividend payable in January, 1914..... 218,500		399,625
Balance to credit of profit and loss, Dec. 31, 1913....		$1,382,532

The credit item to profit and loss of $97,814 in the above statement arose from the fact that the company received additional shares of capital stock from the United Traction Company, Reading, Pa., and the Edison Illuminating Company, Lebanon, Pa., in payment of money advanced on account of construction, improvements and betterments to these properties.

The gross income of the company decreased from $999,514 in 1912 to $784,698 in 1913, but this was due to the fact that the 1912 figure included proceeds arising from the sale of certain treasury securities by subsidiary companies after the payment of their outstanding liabilities. The total of the expense, interest and tax items showed only a slight increase. Dividends decreased from $460,000 in 1912 to $399,625 in 1913, while the surplus as of Dec. 31, 1913, was $1,382,532 as compared to $1,289,391 the year previous.

United Railways Investment Readjustment Plan

On March 31 Mason B. Starring, president of the United Railways Investment Company, New York, N. Y., which controls the United Railways of San Francisco, presented to the stockholders of the company a report made by a special committee to which had been delegated the work of formulating a plan for the readjustment of the debt and income of the company and the payment of dividends. This plan, which will be presented at the annual meeting on May 1, has as its main features the reduction of the classes of securities of the company to three—namely, collateral trust twenty-year sinking fund 5 per cent gold bonds, prior preference stock and common stock.

The plan contemplates the payment and extinguishment of the three issues of preferred stock, dividend certificates, the 6 per cent serial notes and the 6 per cent convertible gold notes of 1910, the cancellation of the trust indenture securing such convertible bonds, and the close of the collateral trust agreement securing the collateral trust 5 per cent bonds so that no further bonds may be issued thereunder. In formulating the plan the committee regarded it as fundamental that every reasonable precaution should be adopted fixing the dividends distributable to the preferred stock holders within limits that would give assurance of continuance and to reduce the company's outstanding capitalization to the simplest form.

Under the suggested plan the preferred stockholders are offered an opportunity of acquiring through an exchange for common stock more than one third interest in the equity of the property and to share in that extent any dividend distributed to the common stock. The prior preference stock which it is proposed to create is to be entitled to 7 per cent cumulative dividends. Of the authorized amount of $12,500,000, the sum of $4,368,000 is to be immediately issued for the retirement of $1,462,500 of preferred stock dividend certificates, $1,300,000 of 6 per cent serial notes, $810,000 of 6 per cent convertible gold bonds and $600,000 of floating debt, the residue to be held for general purposes. An amount of $8,000,000 of this prior preference stock is to be reserved to be used in exchange for the outstanding preferred stock, par for par.

The common capital stock of the company is to be increased from $31,000,000 to $32,400,000, and $12,000,000 is to be reserved for exchange for shares of the present preferred stock. Each holder of preferred stock (listed) is to receive for each share plus accumulated dividends 50 per cent of the par value of such share in 7 per cent prior preference stock and 75 per cent in common stock. Each holder of preferred stock (unlisted) will receive for each share plus accumulated dividends 50 per cent of the par value of such share in 7 per cent prior preference stock and $65.25 of common stock. The present authorized issue of preferred stock is to be reduced from $25,000,000 to $16,000,000.

Holders of each class of stock of the company are to be afforded an opportunity to subscribe for the new prior preference stock at par in an amount equivalent to 12 per cent of the par value of their holdings. Stockholders accepting the plan but not desiring to acquire the new prior preference stock on this basis may pay $2 per share for each share assenting. Stockholders accepting the plan and subscribing to the new prior preference stock may also pay $2 per share and the money derived from these payments is to constitute the compensation for a syndicate organized to underwrite the subscription, by the stockholders, of the $4,368,000 of prior preference stock. This $2 payment is made necessary by the fact that under the laws of New Jersey, in which State the company is incorporated, the stock must be sold at par and the committee had to devise means for providing without recourse either directly or indirectly to the company such a sum as might reasonably be needed to induce a syndicate to underwrite the stock. The plan concludes with a detailed list of various options which are given stockholders in the matter of subscribing to the new stock. Depositaries are to be opened in New York, Philadelphia and Pittsburgh and the plan if approved by the stockholders is to become operative after the assent of at least 80 per cent of each class of stock.

According to the statement made by Mr. Starring, it is anticipated that the net earnings of the company on the present basis of receipts will be somewhat in excess of $900,000 per annum, which, after the extinguishment of some of the present capitalization, will be ample to provide dividends of 7 per cent on the prior preference stock. Furthermore the effectuation of the plan should afford the present preferred stockholders an opportunity to share in the earnings of the company to an extent equivalent to a return on the present holdings in excess of 5 per cent per annum.

Amended Reorganization Plan of Ithaca Companies

The Public Service Commission for the Second District of New York on March 25 rendered a decision approving with certain alterations the plan presented for the reorganization of the Ithaca Street Railway and the New York, Auburn & Lansing Railway, as noted in the Electric Railway Journal of March 7, 1914, page 557. Consequently an amended plan of reorganization was published by the reorganization committee under date of March 30, 1914.

The main provisions of the amended plan are these. A railroad company, which, it is stated, will be called the Central New York & Southern Railroad Corporation, will be

formed to acquire the property of the New York, Auburn & Lansing Railroad. A street railway company to be known as the Ithaca Traction Company will be formed to acquire the properties of the Ithaca Street Railway, which were recently sold under foreclosure and which include the properties of the Cayuga Lake Electric Railway and the Ithaca & Cayuga Heights Railway. The railroad company is to acquire the entire amount of capital stock and the first refunding mortgage bonds of the street railway company to be issued under the plan. The first refunding mortgage bonds of the street railway are to be secured by a first mortgage upon the properties of the company acquired under foreclosure, subject only to $275,000 of underlying bonds.

The railroad company is to have an authorized capital stock consisting of $725,000 of cumulative non-voting preferred stock, subject to redemption or retirement in whole or in part upon any interest dividend date at 150 and accumulated dividends. There will be an authorized issue of $1,275,000 of common stock and an authorized issue of $4,000,000 face amount of first and collateral trust mortgage 5 per cent gold bonds. The street railway company will have an authorized capital stock of $1,000,000 and an authorized issue of $2,000,000 face amount of first refunding mortgage 5 per cent gold bonds.

Of the securities so authorized there will be issued from time to time as needed to carry out the provisions of the reorganization plan, the following amounts: By the railroad company, first and collateral refunding mortgage 5 per cent gold bonds, $1,000,000; preferred stock, $725,000; common stock, $375,000; by the street railway company, first refunding mortgage 5 per cent gold bonds, $488,000 and capital stock of all one class, $400,000.

The $1,000,000 face amount of first and collateral trust mortgage bonds of the railroad company are to be issued and sold at not less than 80 and such part of the proceeds as needed for use in acquiring and vesting in the railroad company ownership of the properties of the New York, Auburn & Lansing Railroad and in the street railway company the property of the Ithaca Street Railway. The remaining $3,000,000 of these bonds are to be reserved for issue from time to time upon the acquisition of branches or extensions of the properties of the railroad company or additional bonds or stock of the street railway company. The $725,000 of the preferred stock of the railroad company is to be available for issue to depositors under the Auburn and Ithaca agreements and the $375,000 of common stock is to be used with the proceeds of the bond issue to aid in discharging the expenses of reorganization and the acquisition of properties.

The $488,000 of first refunding mortgage 5 per cent gold bonds of the street railway company are to be acquired by the railroad company through the use of a corresponding amount of railroad bonds. An amount of $310,000 of the traction bonds are to be reserved for the exchange, purchase or retirement of the underlying bonds of the street railway company. The present issue of capital stock of the street railway company in amount of $400,000 is to be acquired by the railroad company through the sale of a corresponding amount of the latter's preferred stock.

The decision rendered by the Public Service Commission on March 25 was simply an approval of the reorganization plan as it is now amended. It is proposed now to incorporate the two new companies and to proceed with the following out of the details of the reorganization plan, at which time the question must again be presented to the commission for formal approval in regard to each new company.

Special Meeting of New Haven Stockholders

According to the call for the meeting of the stockholders of the New York, New Haven & Hartford Railroad on April 21, 1914, they will be asked to consider and act upon the question whether, "in accordance with an arrangement made between the attorney-general of the United States and representatives of the company, this company shall consent that a decree be made by the United States District Court for the southern district of New York in a suit to be brought by the United States of America, which shall, among other things, provide in substance:

"1. That when the Legislature of Massachusetts shall have removed the prohibition in the charter of the Boston Railroad Holding Company against disposing of the stock of the Boston & Maine Railroad, the stock of said holding company shall be transferred at once to five trustees, and that after arrangements have been made to protect the minority stock of said holding company, said trustees shall sell said Boston & Maine stock prior to Jan. 1, 1917.

"2. That all the shares of capital stock of the Connecticut Company and the Rhode Island Company shall be placed in the hands of trustees, five for each corporation, who shall sell said stocks within five years from July 1, 1914.

"3. That the securities of the Merchants' & Miners' Transportation Company now held by the New England Navigation Company shall be placed in the hands of three trustees, who shall sell said securities within three years from July 1, 1914.

"4. That the securities of the Eastern Steamship Corporation held by the New England Navigation Company shall be sold within three years from July 1, 1914, and in the meantime the New England Navigation Company shall be enjoined against voting upon the stock of the Eastern Steamship Corporation.

"5. That in case the Interstate Commerce Commission shall not take such action under the Panama canal act as to authorize this company to retain control of the steamship lines on Long Island sound, the right shall be reserved to the court to take further action with regard to the control of said steamship lines.

"6. That the securities held by this company in the Berkshire Street Railway shall be sold within five years from July 1, 1914.

"7. That this company shall sell the shares of corporations owning or controlling street railways within the state of New York within five years from July 1, 1914.

"8. That, upon application of this company or any body of trustees provided for in said decree, and for good cause shown, the time within which said trustees in any case are obliged by the terms of said decree to sell the securities held by them may be extended by said court."

The call also provides for consideration and action upon the proposed amendment to the by-laws of the New York, New Haven & Hartford Railroad to reduce the directorate to not less than fifteen nor more than twenty-three members.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—The sale of the Alton, Jacksonville & Peoria Railway has been authorized by the Circuit Court of Madison County, Ill. There are outstanding against the company mortgage claims of $600,000, receiver's certificates of $100,000 and other liens of $60,000. As stated in the ELECTRIC RAILWAY JOURNAL of March 14, 1914, page 608, the property may be purchased by the Clark interests, which control the East St. Louis & Suburban Railway.

Bucks County Interurban Railway, Trenton, N. J.—Interests identified with the Bucks County Interurban Railway have secured control of the Doylestown Electric Company through the purchase of the controlling interest in the stock of that company. New officers have been elected as follows for the Doylestown Electric Company: Sidney L. Wright, president; Walter T. Bilyeu, secretary and treasurer; John Yardley, assistant secretary and treasurer; Gaylord Thompson, general superintendent; Sidney L. Wright, William Redwood Wright, Frank Battles, W. Frederick Snyder, Gaylord Thompson, John Barbler, Walter T. Bilyeu, directors.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has approved the pledge by the Buffalo & Lackawanna Traction Company of $100,000 of its first mortgage 5 per cent twenty-year gold bonds with the Columbia National Bank, Buffalo, N. Y., as collateral security for a loan of $75,000.

Calumet & South Chicago Railway, Chicago, Ill.—The Calumet & South Chicago Railway has been authorized by the Public Utility Commission of Illinois to issue improvement bonds to the amount of $600,000. N. W. Halsey & Company, New York, N. Y., have purchased $350,000 of Calumet & South Chicago Railway first mortgage 5 per cent bonds due in 1927, and are offering them at 95 and interest.

Central New York Southern Railway Corporation, Ithaca, N. Y.—The Central New York Southern Railway Corpora-

tion has been incorporated to succeed the New York, Auburn & Lansing Railroad. The company has elected officers as follows: Roger B. Williams, Jr., president; H. W. Fitz, first vice-president; Charles E. Hotchkiss, second vice-president and general counsel; H. A. Clark, third vice-president, secretary and general manager; T. P. Clancy, treasurer. These officers are the same as those elected for the Ithaca Traction Corporation, the successor to the Ithaca Railway. The reorganization plans for the companies are referred to in detail on page 846 of this issue.

Chicago (Ill.) Elevated Railways.—The Chicago *Economist* said in the issue for April 4, 1914: "It is stated officially that the $30,000,000 collateral 5 per cent notes of the Chicago Elevated Railways which are to mature on July 1, 1914, will be paid. Just what the financing which must take place this summer will be has not been decided. Additional funds must be obtained to make additions and betterments. The plan generally talked of is that a first and refunding mortgage on the Northwestern Elevated Railroad, which ultimately will cover all the property of the company, will be drawn. No definite plans have been formulated for refunding the outstanding issues of Metropolitan and the South Side Elevated bonds. The National City Bank, New York, has been in negotiation with several local banks."

Chicago (Ill.) City Railway.—The Chicago City Railway has been authorized by the Public Utility Commission of Illinois to issue improvement bonds to the amount of $3,000,000. N. W. Halsey & Company, New York, N. Y., have purchased $1,560,000 of Chicago City Railway first mortgage 5 per cent bonds due in 1927, and are offering them at 100 and interest.

Chicago (Ill.) Railways.—The Chicago (Ill.) Railways has been authorized by the Public Utility Commission of Illinois to issue improvement bonds to the amount of $4,000,000. A syndicate which includes the National City Bank and Harris, Forbes & Company, New York, N. Y., is offering $3,000,000 of the first mortgage 5 per cent gold bonds of the company at 98½ and interest. The bonds now issued are part of the $4,000,000 authorized by the commission, the difference having been sold previously in the form of temporary certificates.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—The item which was published in the issue of the Electric Railway Journal for April 4, page 795, in regard to the dividend of the Chippewa Valley Railway, Light & Power Company, was in error. The company paid quarterly dividends of 2 per cent on its common stock on Jan. 1, 1914, and on April 1, 1914, these being exactly the same dividends as were paid on the common stock quarterly during the year 1913. The common stock of the company now outstanding is $1,100,000, and not $1,000,000, and it was on $1,100,000 that dividends have been paid at the rate of 2 per cent quarterly since January, 1913. The company reports that its gross and net earnings for the first quarter of 1914 showed a substantial increase over the earnings of 1913.

Cincinnati (Ohio) Traction Company.—On April 3, 1914, the Ohio Public Utilities Commission ordered the Cincinnati Traction Company and the Cincinnati Street Railway to make an inventory of their property as of April 1, 1914, and have it completed by Oct. 1, 1914.

Denver (Col.) Tramways.—The Denver Tramways has been organized to take over the Denver City Tramways and subsidiary properties. The new company will have $10,000,000 of common stock, $3,000,000 of 7 per cent cumulative preferred stock and $3,000,000 of 6 per cent convertible debenture bonds, convertible between April 1, 1915, and April 1, 1918, into 7 per cent preferred with a bonus of 25 per cent of common. Of the bonds $2,500,000 will be issued and $500,000 held for future purposes. These bonds will be offered to the stockholders of the Denver & Northwestern Railway at 97½ and the proceeds of the issue will provide for the liquidation of the floating debt and for ample working capital. The Denver & Northwestern Railway, the holding company for stock of the present Denver City Tramway, will remain undisturbed with its $6,000,000 of bonds and its holdings of $9,000,000 of stock of the Denver City Tramway, which will be converted into stock of the new company. Among the directors of the new company will be George C. Clark of Clark, Dodge & Company, New York; C. M. Clark of E. W. Clark & Company, Philadelphia; Seeber Edwards of the Industrial Trust Company, Providence, R. I., and Samuel D. Nicholson, Denver. The Consolidated Securities & Investment Company, all the $500,000 of stock of which will be owned by the Denver Tramways, will take over the Boulevard Realty Company, Denver & Inter-Mountain and other subsidiaries not directly concerned in the operation of the street railway system. All subsidiaries, including the Denver City Tramway, will be dissolved as soon as affairs can be adjusted. The new company started on April 1 with current assets of $811,527, including $533,361 cash, and with current liabilities of but $67,186, outside of $589,600 accrued interest and taxes and $12,775, service liabilities. Underlying bonds of the new company aggregate $17,819,295.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has filed with the Secretary of State of New York a certificate increasing its authorized capital stock from $2,000,000 to $5,000,000.

Hudson & Manhattan Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has granted permission to the Hudson & Manhattan Railroad to issue $154,000 of 5 per cent first lien and refunding mortgage bonds, which will be dated Feb. 1, 1913, and will run to Feb. 1, 1957. They are to be sold at not less than 85, and are to be redeemable at 105, plus accrued interest. The proceeds will be devoted to reimbursing the company for money expended from income to discharge previous obligations. The mortgage under which they are to be issued is for $65,000,000, and the commission already has approved of an issue of $37,055,000.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—N. W. Harris & Company, Inc., E. H. Rollins & Sons and Perry, Coffin & Burr, Boston, Mass., are offering at 94½ and interest, yielding 5⅜ per cent, $2,935,000 of Kansas City, Clay County & St. Joseph Railway first mortgage 5 per cent gold bonds dated Sept. 1, 1911, and due Sept. 1, 1941. The interest on these bonds is payable on March 1 and Sept. 1 in New York City and the bonds are callable on any interest date at 105 and interest. They are in the denomination of $1,000 and are registrable as to principle only. The Equitable Trust Company, New York, N. Y., and F. J. Downing, Kansas City, are trustees under the mortgage securing the issue. The circular from the bankers includes a statement in regard to the Kansas City, Clay County & St. Joseph Railway, signed by Phillip L. Saltonstall, president. The authorized capital stock of the company is $10,000,000. Of this amount $4,000,000 has been issued. The total authorized issue of 5 per cent gold bonds is $10,000,000. Of this amount $3,135,000 has been issued. The road has been in complete operation only since May 1, 1913, and the earnings for the initial ten months of operation were as follows: gross earnings, $500,427; operating expenses and taxes, $266,849; net earnings, $233,578; ten months' interest on $3,135,000 of first mortgage 5 per cent bonds, $130,625; surplus, $102,953.

Mesaba Railway, Virginia, Minn.—The syndicate composed of Tucker Anthony & Company, Boston, Mass., and C. D. Barney & Company, New York, N. Y., has sold to W. H. Newbold's Sons and Graham & Company, Philadelphia, Pa., the $1,100,000 of first mortgage twenty-year 5 per cent bonds of the Mesaba Railway, due in 1932. The purchasers of the bonds propose to offer the issue for public subscription.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The New York, New Haven & Hartford Railroad is said to have arranged for the sale of its interest in the Merchants' & Miners' Transportation Company to interests headed by the Mercantile Trust Company, Baltimore, Md., and affiliated with the minority ownership in the line. It is understood that the transaction is for cash, but its terms have not been announced. The disposal of this property by the New York, New Haven & Hartford Railroad is in accordance with the terms of the agreement for the segregation of the company's property entered into with the federal department of justice. The Aetna Life Insurance Company, Hartford, Conn., is reported to have sold at about

$70 a share 5000 shares of New York, New Haven & Hartford Railroad stock, thus practically liquidating all of its holdings of this issue. On Jan. 1, 1914, the company appeared as the owner of 5319 shares which it carried on its books at $409,563, or $77 a share.

North American Company, New York, N. Y.—The North American Company has issued a circular to stockholders offering them for pro rata subscription, in proportion to their respective holdings of stock on the books of the company on April 22, 1914, $3,000,000 of Wisconsin Edison Company debenture bonds and 30,000 shares of capital stock. The terms and conditions of the privilege of subscription are as follows: Each holder of 100 shares of North American stock is entitled to subscribe to a $1,000 debenture bond and ten shares of stock of Wisconsin Edison Company for $1,360. The holders of fifty shares may subscribe to a $500 bond and five shares of stock for $680, and the holders of ten shares to a $100 bond and one share of stock for $136. Warrants will be mailed on April 23 to holders of record April 22, and no subscriptions will be received unless accompanied by warrants. The debenture bonds and shares of stock have been underwritten and all not subscribed for on or before May 15, 1914, will be sold to members of the syndicate, who have agreed to purchase the same. The syndicate is headed by William C. Sheldon & Company and G. Ulbricht. The authorized amount of 6 per cent convertible debentures of the Wisconsin Edison Company is $10,000,000, of which $6,500,000 is outstanding, and the capital stock authorized, which is without nominal or par value, is 400,000 shares, of which amount 215,000 shares are outstanding.

Portsmouth (Ohio) Street Railway.—The Public Utilities Commission has authorized the Portsmouth Street Railway to issue $425,000 of first mortgage bonds, the proceeds to be used to construct a line between Portsmouth and Ironton, a distance of 20 miles. The company has also been authorized to capitalize improvements and betterments to the amount of $250,000.

Scranton & Wilkes-Barre Traction Corporation, Scranton, Pa.—Control of the Scranton & Wilkes-Barre Traction Corporation has passed to a syndicate in which William C. Sproul, Wilmington, Del., Bioren & Company, Philadelphia, and George S. Fox & Sons, Philadelphia, are interested. The Scranton & Wilkes-Barre Traction Corporation controls the Lackawanna & Wyoming Valley Railroad.

Second Avenue Railroad, New York, N. Y.—The attorney for a small judgment creditor against George W. Linch as receiver of the Second Avenue Railroad, appeared in the Supreme Court recently before Justice Weeks with the attorneys of two other similar judgment creditors and argued a motion for the "termination of the receivership" of the company. Each of the three claims were for only about $150 damages for personal injuries received since the road went into the hands of the receiver. Brainard Tolles, attorney for Mr. Linch, said that although the judgments against the receiver for personal injuries were just debts they should not take precedence over other expenses which were clearly regarded by all courts as operating expenses. In accepting the brief filed by Mr. Tolles Justice Weeks said: "My present impression is that all I can do is to order you to pay these small judgments for personal injuries and let you take the matter up to the Court of Appeals. I do not see any justice in regarding these judgments for personal injuries as other than operating expenses. They ought to be paid even ahead of back taxes."

Southern Pennsylvania Traction Company, Chester, Pa.—The Southern Pennsylvania Traction Company has arranged with Newburger, Henderson & Loeb, Philadelphia, Pa., to furnish the funds necessary to acquire on May 1, 1914, the $250,000 of first mortgage 5 per cent bonds of the Chester Traction Company. The plan provides for the extension of the bonds from May 1, 1914, for thirty years, with an option to retire them after 1918 at 103 and interest, or to receive from the bankers the amount which will be due upon their acquisition of the bonds. Holders are requested to deposit their bonds with the bankers on or before April 15.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—The Washington Stock Exchange has listed $1,455,450 of the preferred stock and $5,079,000 of the 5 per cent bonds of the Washington, Baltimore & Annapolis Electric Railroad.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—The Youngstown & Ohio River Railroad has reduced its preferred stock dividend from 4 per cent to 3 per cent per annum.

Dividends Declared

Boston (Mass.) Suburban Electric Companies, quarterly, 1 per cent, preferred.

Chippewa Valley Railway Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred; quarterly, 2 per cent, common.

Dallas (Tex.) Electric Company, 3 per cent, first preferred; $2.50, second preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Metropolitan West Side Elevated Railway, Chicago, Ill., quarterly, 1¼ per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Ottawa (Ont.) Electric Railway, quarterly, 3 per cent.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

South Side Elevated Railway, Chicago, Ill., quarterly, 1½ per cent.

Stark Electric Railroad, Alliance, Ohio, three-quarters of 1 per cent.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb.,	'14	$57,347	*$28,985	$28,362	$17,422	$10,940
1 " "	'13	54,385	*26,905	27,480	17,340	10,140
12 " "	'14	771,941	*350,992	420,949	207,684	213,265
12 " "	'13	718,240	*325,530	392,710	202,074	190,636

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Feb.,	'14	$88,664	*$54,664	$34,000	$27,208	$6,792
1 " "	'13	88,878	*55,505	33,373	23,740	9,633
12 " "	'14	1,208,315	*715,896	492,419	304,803	187,616
12 " "	'13	1,091,523	*654,994	436,529	271,621	164,908

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, CLEVELAND, OHIO

1m., Feb.,	'14	$24,813	*$16,233	$8,581	$10,828	†$2,248
1 " "	'13	24,548	*15,910	8,639	10,278	†1,589
2 " "	'14	53,627	*33,027	20,594	21,817	†1,017
2 " "	'13	52,643	*22,591	20,052	20,699	†647

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Jan.,	'14	$231,944	*$153,258	$78,686	$48,102	$30,584
1 " "	'13	213,628	*122,912	90,716	48,356	42,360
12 " "	'14	2,719,696	*1,635,163	1,084,533	588,880	495,653
12 " "	'13	2,474,630	*1,368,113	1,106,517	578,772	527,745

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Feb.,	'14	$90,021	*$63,821	$26,201	$35,285	†$9,084
1 " "	'13	89,199	*60,111	29,089	34,938	†5,848
2 " "	'14	195,509	*132,301	63,209	70,342	†7,133
2 " "	'13	190,192	*125,398	64,763	69,875	†5,082

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m., Feb.,	'14	$39,554	*$36,450	$3,104	$15,347	†$12,243
1 " "	'13	41,349	*30,778	10,571	14,485	†3,914
12 " "	'14	674,106	*439,654	234,452	181,299	53,153
12 " "	'13	631,259	*388,670	242,589	173,146	69,443

MONONGAHELA VALLEY TRACTION COMPANY, FAIRMONT, W. VA.

1m., Feb.,	'14	$69,801	$24,474	$45,326	$25,545	$19,781
1 " "	'13	65,748	21,595	44,153	24,103	20,050
2 " "	'14	148,307	57,744	90,564	51,112	39,452
2 " "	'13	134,384	46,625	87,759	48,205	39,554

PORTLAND (MAINE) RAILROAD

1m., Feb.,	'14	$64,123	*$50,027	$14,096	$22,713	†$8,617
1 " "	'13	64,487	*55,664	8,823	10,274	†1,451
12 " "	'14	1,036,612	*676,314	360,298	206,308	153,990
12 " "	'13	991,339	*696,854	294,485	123,249	171,236

*Includes taxes.
†Deficit.

Traffic and Transportation

Experience in Kansas City With Alternate Stops

One of the first electric railway companies in the United States to experiment with the so-called "odd and even" system of staggering car stops was the Metropolitan Street Railway, Kansas City, Mo. The company has successfully used the alternate stop on two of its lines since early in 1911, or almost three years. The odd and even system was put into effect on the Troost Avenue line on April 20, 1911, after exhaustive tests had been made. The new plan apparently proved its worth immediately, and on May 6 of the same year the plan was applied to the Brooklyn Avenue line. Both of these are important lines, and in volume of business handled are surpassed by few, if any, of the thirty-odd other lines operated by the company. After three years of operation of the alternate-stop system, officers of the Metropolitan Street Railway believe the plan to be thoroughly worth while. The public also received the odd and even system well and has made no effort to re-establish the old style on the two lines on which the new method is utilized. The alternating stop system is used only during rush traffic hours on week days, when the service is maximum. The plan is not approved on Sundays, it has been found.

At designated hours metal signs are placed on the front end of cars, marked "odd" and "even" respectively. The signs alternate. South bound cars bearing the "odd" sign stop at Thirty-third, Thirty-fifth, and other odd streets, while the "even" cars halt at Thirty-second, Thirty-fourth, etc. On the numbered streets, running east and west, the company had a problem slightly more difficult, as the intersecting streets bear names and not numbers, such as Locust, Oak, etc. This obstacle was overcome by the simple expedient of painting signs on the line poles alongside of the track at such intersections, the words "odd" and "even" again being called into play. A reduction of ten minutes per round trip has been effected on the Troost Avenue line in the morning by virtue of the alternating stop system. The run is now made in sixty-five minutes, as compared to seventy-five under former conditions. In the evening rush hour the running time is seventy minutes, as compared to seventy-five previously. A five-minute saving in the schedule on the Brooklyn Avenue line has been made on both morning and evening runs under the alternate stop system, the round trip formerly being made in sixty-five minutes, and now in sixty. While this saving of time is considered worth while, officers of the company are impressed particularly with the advantages which the system has developed of distributing the load more evenly.

Under former conditions, when a car halted on a corner where a crowd was waiting, the entire group usually boarded the vehicle, even if another car on the same line was just behind. With the alternate stop in operation, about half of the members of a crowd find that the car is an "odd" one and therefore not desirable in view of their destinations. They therefore await the arrival of an even car, the load at rush hours thus being evenly distributed over the cars on the two lines operating under the alternate stop plan.

Philadelphia Proposals in Pamphlet Form

The department of city transit of Philadelphia has issued a pamphlet in which A. Merritt Taylor, the transit director, replies to the proposals made by the Philadelphia Rapid Transit Company at the last meeting of the Councils' special committee on rapid transit, held on March 25. After comparing the Philadelphia Rapid Transit plan and the counter proposal for rapid transit development offered by the department, both of which plans are now before Councils awaiting public discussion, Director Taylor concludes that it would be more profitable to the city to have the city-built lines operated independently than by the Philadelphia Rapid Transit Company under the conditions demanded by that company in its proposals. He also suggests that the Public Service Commission be petitioned to inquire into the reasonableness of the exchange ticket charges, should no arrangements be made with the Philadelphia Rapid Transit Company. After a digest of the two plans, Director Taylor reviews the concessions obtained by the company under the 1907 contract with the city, and then discusses the company's ability to finance the additional investment of $9,438,300 recommended in the proposals of the department of city transit. Director Taylor thinks the Philadelphia Rapid Transit Company should be able to raise without difficulty this investment, upon the security of the equipment purchased, and by mortgaging the leasehold upon which "the company would receive a return upon its investment before the city secured any return whatever upon its investment, which, in the case of the Broad Street subway, would amount to $34,682,000."

Fare on Long Island Suburban Line Upheld.—The Public Service Commission of the Second District of New York has refused to order a reduction in the fare over the line of the New York & Long Island Traction Company to Floral Park, Mineola and other places.

Complaints Against St. Louis Company Dismissed.—The Public Service Commission of Missouri has dismissed the complaints filed with it against the United Railways, St. Louis, Mo., in which improper ventilation and overcrowding were alleged. The commission says that these important matters should only be taken up in connection with the street railway system of the city when treated as a comprehensive whole, and expressed the opinion that it is unwise to consider them in disjointed bits and make orders directed to fractional parts, when they are in reality inseparably interlinked with the whole.

Rapid Transit at Cincinnati Discussed.—At a recent meeting of the ways and means committee of the City Council of Cincinnati, Ohio, the Bleekman-White plan for building a union station and bringing the interurban cars into the city was discussed. It is thought that if the Arnold plan is found to incur too great an expense, the other proposition may be taken up. J. G. Schmidlapp told the committee that when he was interested in a plan to secure rapid transit for Cincinnati about ten years ago, his engineer informed him that the route chosen by Mr. Bleekman was the only feasible one from a financial standpoint.

Brooklyn Companies Accept Transfer Order.—The Coney Island & Brooklyn Railroad, the Nassau Electric Railroad and other surface railways in the Brooklyn Rapid Transit System have accepted the order recently made by the Public Service Commission for the First District for an entirely new system of transfers. The companies state that they will obey the order "under protest and compulsion" and without waiving any of their rights. The order takes effect on May 1, 1914, but the companies say it will be impossible to inaugurate the new system on that date, and desire such extension of time as may be necessary to put it into effect.

Protest Against Sale of Liquor to Employees.—When the Allegheny County license court opened for its annual session the first week in March the Pittsburgh (Pa.) Railways filed remonstrance against every saloonkeeper whose place of business is near a car house or a "relief" stop. Attorneys for the company explained to the court that those against whom remonstrances were filed had catered to the trade of motormen and conductors in uniform. It was the company's determination, the lawyers said, to prevent this. In each case the saloonkeeper went before the license court judges and promised not to sell intoxicants to railway employees who were in uniform.

Employees' Magazine in San Francisco.—The first issue of *The United Railroads Magazine* devoted to the interests of the employees of the United Railroads, San Francisco, Cal., was dated March, 1914, and was published during the latter part of the month. It contained eight pages and the sub-heads for departments under which the contents are arranged include "Trolley Sparks," "Commendable Records," "Safety First" and "Contributors' Box" in addition to the editorial announcement. As stated in the ELECTRIC RAILWAY JOURNAL of March 28, 1914, page 746, the editor of the magazine is Noble Hamilton, assistant to J. W. Lilienthal, president of the company.

Noonday Transfers on Utica Lines.—The New York State

Railways, Utica Lines, is by special permission of the Public Service Commission of the Second District of New York issuing noonday transfer tickets between Frankfort and Ilion, between Ilion and Mohawk, and between Mohawk and Herkimer. Passengers traveling between the above points between the hours of 12 noon and 1 p. m. (except on Sundays and legal holidays) and paying cash fares of 5 cents, or surrendering tickets or other form of transportation between such points and of face value 5 cents, will upon request to the conductor be given non-transferable tickets good for return from destination to starting point, if used the same day and between the same hours.

Relieving Congestion in Los Angeles.—The first step toward the permanent relief of electric railway congestion on Main Street, Los Angeles, Cal., was taken on March 22, 1914, when the new municipal railroad on San Pedro Street was opened. Under the temporary plan of relief that will be tried out, 112 trains per day will be taken off Main Street before 7 p. m., at which time the temporary station behind the Pacific Electric Railway building will be closed for the night and trains will be run into the depot from Main Street. They will be routed over the San Pedro Street line. Extra storage tracks are being built back of the depot and two additional loading platforms are being constructed for the benefit of the traffic to be handled before the permanent elevated is completed.

Prizes for Accident Prevention Essays.—To stimulate interest among its employees in the "safety first" movement, the Union Traction Company of Indiana, Anderson, Ind., has issued an announcement to the effect that prizes aggregating $30 will be awarded to trainmen writing the three best essays on the subject "Prevention of Accidents to Passengers." The announcements in regard to the essay contest were posted in every division headquarters and given to every trainman. The company will award $15 to the winner of first prize, $10 to the winner of second prize and $5 to the man writing the third best essay. The papers are to be turned in to the division superintendents of the company before May 11. E. E. Slick, claim adjuster, will be chairman of the committee of judges. Each local safety committee will have a representative on the committee appointed to judge the papers. All trainmen are eligible to compete for the prizes.

Texas Traction Advertising Department.—Since the completion of the Waco-Dallas-Corsicana interurban line in Texas, the Southern Traction Company and the Texas Traction Company have organized an advertising department to handle advertising in their cars, as well as to publish in the *Texas Interurban*, their official paper. For the purpose of setting forth the advantages of advertising in the cars of the companies, the advertising department has issued a pamphlet, "Facts for Advertisers," which contains information regarding the mileage, the number of cars and the average number of people handled per day or per month over each division. The purpose of the company magazine is stated in part as follows: "It is devoted to the interest of patrons and employees and the development of the territory traversed by the two interurban lines. Each month 8000 copies are printed and distributed free on all the cars operating over these two interurban railways."

Waste Paper Salvage in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., has concluded that the systematic saving and selling of waste paper may be made profitable. Experiments have been conducted at the Forty-eighth and Harrison Street carhouse, from which the cars of seven lines are operated. These seven lines have averaged 200 lb. of waste paper daily, or three tons monthly. The present market price on paper is around 20 cents for 100 lb. in Kansas City. Each coach cleaner at the Forty-eighth and Harrison Street carhouse is equipped with a burlap bag into which he puts the waste paper in each car. As the sacks are filled they are stored in an old cable coach, now used only for that purpose. At the end of each month the sacks of paper are weighed and turned over to waste paper companies. The crews usually collect the waste after each round trip and stow it beneath one of the box seats pending the return to the carhouse. The officers of the company are now considering making the waste paper salvage plan general.

Suburban Fare Question in Cincinnati.—W. Kesley Schoepf, president of the Cincinnati (Ohio) Traction Company, has written a letter to the chairman of the manufacturers' committee of St. Bernard dealing with the question of a possible reduction in fare to outlying suburbs through which the Mill Creek Valley lines of the Ohio Traction Company are operated. Mr. Schoepf suggested that the villages in the Mill Creek Valley combine in selecting a commission with power to represent them in negotiating with the company for revised rates of fare in all of the territory from the Zoo in Cincinnati to Glendale. He referred to the offer of the company of a 5-cent fare to Gas Hall, Carthage, under conditions previously outlined. In view of the fact that the communities met jointly to demand a 5-cent fare he saw no reason why they could not also jointly authorize a committee to determine what fare conditions would be equitable to both the company and the community which it serves. Despite the soundness of the argument that a reduced rate of fare helps to build up a community there is a point beyond which a 5-cent fare cannot be granted with any expectation of profit to the company or good service to the community.

Northampton Arbitration.—Evidence on behalf of the Northampton (Mass.) Street Railway was completed at the arbitration proceedings on March 28, 1914. L. D. Pellissier, general manager of the company, showed that a dozen men who were paid 17.5 cents an hour in 1900 now receive 27.36 cents an hour for every hour they are on duty. These men are allowed a rate of 26 cents and are credited with ten hours' work for every 9½ hours of service. It was stated that no company in Massachusetts pays the maximum wage in less than three years. Wages were raised on the Northampton Street Railway in 1909 and 1912. The maximum wage on the road has increased faster than the cost of living. Mr. Pellissier said that from his own four years' experience as a conductor he believed that five years are required to develop a car service man to the point of maximum efficiency and that a single year's experience involving four seasons only is inadequate to bring out the best that is in a motorman or a conductor. Officials of the union condemned the unwillingness of certain employees to take out extra cars late at night as contrary to the policy of the organization. The closing arguments in the wage case were heard on April 3 and are referred to at length on page 841 of this issue.

New Twin City Folder.—The Twin City Rapid Transit Company, Minneapolis, Minn., has issued its new folder "The Twin Cities, 1914." This is the ninth folder of the kind that the company has prepared. An effort has been made to improve each year's issue, with the result that the new one is unusually complete. A large map in the center of the folder shows the company's lines and the park systems of both cities. There have also been added very complete maps of the central portions of Minneapolis and St. Paul as well as other features. The text matter has been rewritten and contains all the significant historical, commercial and educational information about the territory very carefully condensed. The legends in and around the cities have been woven into the story, with the object of encouraging tourists to visit the twin cities and use the company's lines, although the company has kept modestly in the background. An elaborate system has been developed for distributing the folders. In a small advertisement which is published in the daily papers for a period of six or eight weeks in the spring, the company offers to send a copy of this folder to any address on receipt of 6 cents in stamps. From fifty to 150 letters a day are received during the time that the advertising campaign is being conducted, some of these inquiries coming from points within a radius of 400 miles of the twin cities. Very frequently the people who write from a distance for the folders express their intention of visiting the twin cities. All the steam railroads which enter Minneapolis and St. Paul are supplied with the folders and distribute them to the principal ticket agencies throughout the United States. The pursers of the Mississippi River steamboats also distribute them to passengers after leaving St. Louis and the hotels are supplied with the folders for display in their timetable racks. Altogether the character of the folder makes it worthy of entrance into places which are usually inaccessible to ordinary advertising matter. The folder is issued under the direction of A. W. Warnock, general passenger agent of the company.

Personal Mention

Mr. W. C. Phillips has resigned as superintendent of the Gary & Interurban Railroad, Gary, Ind.

Mr. John H. Sullivan, for the last twelve years general storekeeper for the Indianapolis Traction & Terminal Company, Indianapolis, Ind., resigned on April 1.

Mr. Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., sailed from New York on April 7 on the *Mauretania* for England. He expects to remain abroad until July.

Mr. Winthrop More Daniels, of New Jersey, who was nominated recently by President Wilson for appointment to the Interstate Commerce Commission, has been confirmed as a member of the commission by the Senate. Mr. Daniels is a member of the Board of Public Utility Commissioners of New Jersey.

Mr. Gaylord Thompson, vice-president and general manager of the New Jersey & Pennsylvania Traction Company and the Bucks County Interurban Railway, Trenton, N. J., has also been appointed general superintendent of the Doylestown (Pa.) Electric Company, control of which has passed to interests identified with the Bucks County Interurban Railway.

Mr. Norman Morrison, who has lately been connected with the Birmingham Railway, Light & Power Company, Birmingham, Ala., in a confidential capacity, has resigned from the company to join Mr. Jack Allison in the real estate business, with offices in the Steiner Building in that city. Mr. Morrison was connected with the company for twenty-six years.

Mr. T. L. Sturgeon, who was appointed in 1912 to take charge of the power installation of the entire system of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has returned to New York, where he is connected with the home office of the Republic Railway & Light Company, by which the Mahoning & Shenango Railway & Light Company is controlled.

Mr. Milan V. Ayres, formerly connected with Ford, Bacon & Davis, New York, N. Y., as statistician, has been appointed to the valuation board of the Interstate Commerce Commission. Before becoming connected with Ford, Bacon & Davis Mr. Ayres was chief engineer of the Mobile Light & Railroad Company, Mobile, Ala., and previous to that he was with the Rockland Light & Power Company, Nyack, N. Y. He was graduated from the Massachusetts Institute of Technology and was electrical and mechanical engineer with the Boston & Worcester Street Railway, Boston, Mass., for many years.

Mr. E. W. P. Smith has been appointed city electrician of Cleveland, Ohio. Mr. Smith was graduated in electrical engineering from Colorado College, Colorado Springs, Col., in 1908. After a year of operating experience in the West he entered the employ of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., in the railway engineering department. Mr. Smith was later employed by the city of Cleveland in the smoke-prevention division where a preliminary report was prepared on the electrification of the steam roads which operate into Cleveland. During the latter part of 1913 he was connected with the mechanical department of the Lake Shore & Michigan Southern Railroad.

Mr. W. L. Davis, formerly assistant secretary and assistant treasurer of the Texas Power & Light Company and affiliated companies, has been appointed superintendent of accounts of the Strickland-Goodwin Management Association, Dallas, Tex., succeeding Mr. J. R. Wolfe, assigned to other duties. The Strickland-Goodwin syndicate owns and operates the lines of the Texas Traction Company, consisting of the interurban railway between Dallas and Denison, Tex., and lines in McKinney, Sherman and Denison, and the Southern Traction Company, which operates the interurban system between Dallas and Waco and Corsicana, also city lines in Waco, Corsicana and Waxahachie, consisting in all of about 300 miles of road.

Judge Frank Irvine, dean of the college of law, Cornell University, has accepted the appointment by Governor Glynn to the Public Service Commission for the Second District of New York. It is expected, however, that he will continue his duties as dean of the law college until the end of this year. Judge Irvine was born in Sharon, Pa., on Sept. 15, 1858. He was graduated from Cornell in 1880 with the degree of B. S., which corresponds to the present Arts degree. In 1883, having been graduated from the National University Law School in Washington, he was admitted to the bar. During these years Judge Irvine served as a clerk in the district attorney's office for the District of Columbia, and was later made assistant to the district attorney. He held this position until the spring of 1884. He practised law in Omaha until 1891 when he was appointed by the Governor of the State to fill a vacancy in the District Court of Nebraska. In the fall of that year he was elected to the full term on the democratic ticket. This court corresponds to the Supreme Court of New York State. He was made a member of the Supreme Court Commission, the highest court of the State of Nebraska, in 1893. Judge Irvine re-entered active practice in 1899, and returned to Cornell in 1901. On the death of Dean Huffcutt of the college of law in 1907 he succeeded to the deanship of that college. He is a member of the American Bar and New York Bar Associations and for the past seven years has served on the committee of the American Bar Association for the Simplification of Procedure.

OBITUARY

Henry H. Forsyth, secretary of the Forsyth Brothers Company, dealers in railway supplies, and a resident of Chicago since 1872, is dead.

John Kinnarney, former superintendent of construction of the Louisville (Ky.) Railway, died in Louisville recently at the age of sixty-nine years. Mr. Kinnarney was well known in Louisville by reason of his long service with the railway company. He was a native of Ireland.

Convention of the Doherty Organization

The annual convention of managers of operating companies of the Doherty organization was held at the Hotel Manhattan, New York, on April 6 to 10. The convention was the largest of the annual gatherings that have been held by the Doherty organization. About 150 representatives of 100 companies were in attendance. Nearly all the companies in the Doherty organization were represented. Ten regular sessions were held during the week. F. W. Frueauff presided at the opening session. George Williams acted as chairman during the new-business session. On the evening of April 9 there was an informal dinner at Healy's restaurant in New York.

At the opening meeting the subject of discussion was the relation of companies to the public, state and city commissions. Addresses on this subject were made by F. W. Frueauff and C. T. Brown. The next session was devoted in part to a discussion of the new financial plan of the Cities Service Company. Paul R. Jones, secretary and auditor of the Cities Service Company, discussed the relation of the auditing department to local companies.

The sessions of April 7 were devoted entirely to the natural-gas industry and industrial gas sales. Those who made addresses were Holton H. Scott, Alfred J. Diescher, Frank Fisher, C. L. Bullock, H. R. Straight, F. M. Lowry and Ira Neely.

On April 8 Elbert Hubbard, East Aurora, N. Y., addressed the convention on the subject of co-operation and the relation of employees of public utility companies to the public. Among the others who spoke were Henry Loebel, C. L. Bullock, W. H. Gardner, M. R. Bump, Holton H. Scott, F. J. Petura and R. G. Griswold.

There was a welfare and "safety first" session at which the discussion was led by G. O. Smith. One of the sessions was devoted to the topic of operating statistics of 1913. At the following session operating estimates for 1914 were considered. Henry L. Doherty was on the program for an address on "The Public Utility Manager."

The spring meeting of the Empire State Gas & Electric Association will be held at the Alert Club, Medina, N. Y., on April 22. The morning session will be devoted to the new workmen's compensation law and to the accident-prevention work of the safety committee.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***South Florida & Gulf Railroad, Kenansville, Fla.**—Incorporated in Florida to build an electric or steam railway from Kenansville in a southerly direction through Osceola County to a point on the Kissimmee River at or near Bassinger, a distance of 36 miles. Capital stock, $50,000. Officers: C. R. Armstrong, Rochester, Minn., president; Walter F. Schoch, Shokopee, Minn., vice-president; Henry F. Benter, Kissimmee, Fla., secretary and treasurer.

***Idaho-Pacific Railway, Pocatello, Idaho.**—Application for a charter has been made by this company in Idaho to build an electric railway to connect Twin Falls County with the Hagerman Valley. Capital stock, $250,000. Officers: M. J. Sweeley, president; H. A. Stroud, vice-president, and Henry Schildauer, treasurer.

Ismay, Ekalaka & Southern Electric Railway & Power Company, Ismay, Mont.—Application for a charter has been made by this company in Montana to build an electric railway from Ismay, on the Chicago, Milwaukee & St. Paul Railway, and about 75 miles east of Miles City, to Ekalaka, about 44 miles distant, and thence on to Camp Crook, S. D. Capital stock, $500,000. Officers: William Fulton, Ismay, president; David Bickle, Ismay, vice-president; George J. Murphy, secretary and treasurer; J. E. Prindle, general manager; A. J. Haley, assistant general manager. [E. R. J., Dec. 27, '13.]

***Nova Scotia Tramways & Power Company, Halifax, N. S.**—Application for a charter has been made by this company in Nova Scotia to take over the Halifax Electric Tramways as noted in the ELECTRIC RAILWAY JOURNAL of April 4, 1914, page 795.

FRANCHISES

Birmingham, Ala.—The Birmingham Railway, Light & Power Company's franchise for the Norwood extension will not be taken up by the company, and the line will not be built. The disagreement arose over the duration of the contract. The proposed franchise was for a line through the new Norwood Boulevard extension of the Birmingham Realty Company, connecting with the present Norwood line in Birmingham.

Dixon, Ill.—The Sterling, Dixon & Eastern Railway has received a franchise from the Board of Supervisors for a line on the Hazelwood road from the city limits of Dixon to the site which has been selected for a new state epileptic colony.

Paxton, Ill.—The Kankakee & Urbana Traction Company has asked the Council for a franchise in Paxton. The company has received a fifty-year franchise from the Council in Ludlow.

Orange, N. J.—The Public Service Railway has asked the Council for a franchise to extend its Central Avenue line in Orange.

Buffalo, N. Y.—The International Railway has received an extension of time of one year on its franchise on Bailey Avenue in Buffalo.

Charleston, S. C.—The Charleston & Summerville Interurban Railway has received an extension of time on its franchise from April 1 to Aug. 1, 1914. This 22-mile line will connect Charleston and Summerville. J. L. David, Charleston, president. [E. R. J., Aug. 30, '13.]

Chesterfield, Va.—The South Richmond & Chesterfield Railway has received a franchise from the Council in Chesterfield. This company plans to build an electric line from the intersection of Broad Rock Road and Hull Street, Richmond, to Falling Creek. John C. Robertson, Richmond, is interested. [E. R. J., Feb. 28, '14.]

***Seattle, Wash.**—The City Council has introduced a resolution authorizing and directing the preparation of plans to build an electric railway on Rainier Avenue and other streets in Seattle.

TRACK AND ROADWAY

Birmingham & Chattanooga Railroad, Birmingham, Ala.—About 2 miles of grading has been completed by this company on its 147-mile line from Birmingham, Ala., to Chattanooga, Tenn., via Oneonta, Boaz, Crossville, Sylvia and Wanhatchie, Tenn. Jordan & Phillops, Birmingham, have the contract for grading 10 miles of this line. W. W. Shortridge, Boaz, vice-president. [E. R. J., Dec. 27, '13.]

Rome & Gadsden Railroad, Gadsden, Ala.—The project to build the 60-mile electric line between Rome, Cave Springs, Center and Gadsden has been abandoned for the present, as financial backing could not be obtained to build the line. Louis S. Daniel, Cordele, general manager. [E. R. J., Nov. 29, '13.]

Lethbridge (Alta.) Municipal Railway.—This company will submit a by-law to the ratepayers asking authority to make the necessary expenditures to build the extension to Hardieville during the year. Plans are being considered to build about 4 miles of new track in Lethbridge during the year.

Parker, Colorado River Valley Electric Railway, Parker, Ariz.—Final surveys are being made and it is planned to begin work about May 1 on this 50-mile railway to connect Parker and Blythe. The power house will be located about ½ mile north of Parker on the Colorado River. The repair shops will be located in Parker. The company will furnish power for lighting purposes and will build a light plant at Parker. Capital stock, authorized, $500,000. Capital stock, issued, $50,000. W. H. Thorpe, manager. [E. R. J., Feb. 21, '14.]

Pacific Electric Railway, Los Angeles, Cal.—The construction of an electric railway to the crest of the San Bernardino mountains for a sight-seeing line is being considered by this company.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—An extension of the San Lorenzo line into San Lorenzo Grove is being considered.

Marin County Electric Railway, Mill Valley, Cal.—This company has been granted authority by the Railroad Commission to construct an electric railway in Mill Valley and to sell $67,000 in stock for its construction. The first branch of the new line will run up to the Cascades and the base of the trails to Tamalpais, Muir Woods, Big Lagoon and the Bolinas district. The line will extend along Throckmorton Avenue to the Northwestern Pacific depot and thence to the high school on the Sausalito road. [E. R. J., March 21, '14.]

***Redwood City, Cal.**—The San Mateo County Development Association has found that there are no legal obstacles to the county obtaining a right-of-way down the California peninsula for a railroad, and action will be taken immediately toward acquiring rights for an electric line out of San Francisco to Palo Alto. The right-of-way and the franchise will be held by the county until they can be disposed of to a company that will build an electric railroad and agree to operate it on a basis which will solve the rate question for the peninsula communities.

Santa Barbara & Suburban Railway, Santa Barbara, Cal.—An extension from Santa Barbara to Carpinteria is being considered by this company.

Sacramento Valley West Side Electric Railway, Willows, Cal.—Grading has been begun on the section of this railway from the connection with the Oakland, Antioch & Eastern Railroad north to Dixon. The J. Hughes Construction Company has the contract for the work. H. R. Timm, Dixon, secretary. [E. R. J., April 4, '14.]

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—During the year this company plans to expend between $300,000 and $500,000 in the betterment of its lines in Honolulu. Engineers are engaged preparing estimates for materials needed and as soon as this work is completed orders will be placed for steel rails, fish plates, tie rods, cross-overs, switches and all other metal supplies required.

Kankakee & Urbana Traction Company, Urbana, Ill.—Ties and poles have been purchased by this company for its extension from Ludlow to Paxton. Grading has been completed and work will be begun at once.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill.—This company is asked to remove its tracks lying within the cor-

porate limits of North Aurora, a distance of 1½ miles, from the east side to the center of the highway.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—Plans are being formulated by this company to begin work at once on its electric line to connect Boonville, Christney and Lynnville, Ind. At a recent meeting of the directors of this company the following officers were elected: J. P. Chrisney, president; James A. Hemenway, vice-president; T. P. Tillman, secretary and treasurer. [E. R. J., Feb. 7, '14.]

Union Electric Company, Dubuque, Ia.—During the next few weeks this company expects to build 1 mile of new track in Dubuque. All material has been purchased.

Fort Scott & Pittsburgh Railway, Fort Scott, Kan.—This company has asked the Kansas Public Utilities Commission for permission to sell $950,000 of bonds and $100,000 of stock. This is part of a plan to build a 35-mile line to connect Fort Scott and Pittsburgh via Garland, Arcadia, Mulberry and Frontenac. A. B. Dickman, Fort Scott, president. [E. R. J., March 21, '14.]

Garden City, Kan.—W. H. Baird, general manager of the Garden City Sugar & Land Company, states that the proposed electric railway to connect the company's numerous irrigation ranches will not be built this year. [E. R. J., March 28, '14.]

Iola (Kan.) Electric Railroad.—Extensive improvements are being made by this company on its lines in Iola and on the line between Iola and La Harpe.

***Pittsburg, Kan.**—Commercial organizations of Pittsburg and Columbus, Kan., are co-operating in plans for the construction of an electric railway from Columbus to Miami, Okla., a distance of 22 miles.

Kansas Central Traction Company, Topeka, Kan.—At a special election held at Columbus, Kan., on April 1, the proposition of issuing bonds to the extent of $10,000 to assist in financing an electric line from Columbus to Altamont was carried by a majority of 147. Oswego and other townships which will profit from the railway already have voted $35,000 in bonds, providing the line is in operation by Jan. 1, 1915. The company also proposes to build an electric line between Altamont and Coffeyville to connect with the Union Traction Company's line. [E. R. J., Jan. 24, '14.]

Arkansas Valley Interurban Railway, Wichita, Kan.—O. A. Boyle, general manager of this company, has disposed of his interest in the Interurban Construction Company to George Theis, Jr., who will assume the management of the company, which plans to build an electric line between Wichita and Hutchinson, Kan. Mr. Boyle will continue as a director of the company.

Louisville (Ky.) Railway.—It is understood that arrangements have been made between the Louisville Railway and the Louisville Board of Public Works by which the route of the company's crosstown line will be changed, the proposed construction of a heavy concrete bridge over Beargrass Creek at Ellison Avenue, sufficiently strong to bear double tracks, lending strength to this probability. The change would involve the amendment of the company's franchise to enable it to run on Ellison Avenue instead of on several other streets.

Madisonville-Nortonville Light, Power & Traction Company, Madisonville, Ky.—The construction of the proposed electric line between Madisonville and Nortonville is now pending on a proposition made by the company to the city, which contemplates the sale to the company of a franchise to furnish light to the city, to be distributed through the city's own plant. James Breathitt, Jr., representing the company, declared at a recent meeting in Madisonville that the company is in a position to begin construction work in thirty days and to push it rapidly to completion, but that it will not do so unless it is assured of a market for its surplus current in Madisonville. The City Council is considering the matter of passing an ordinance creating the franchise, as asked by the company. [E. R. J., March 21, '14.]

Shreveport (La.) Traction Company.—This company contemplates the double-tracking, extending and improving of several of its lines in Shreveport during the coming season.

Detroit (Mich.) United Railway.—During the year this company plans to reconstruct its Woodward Avenue tracks from Willis Avenue south to Witherell Street in Detroit. The new track will be 9-in. plain girder rails. The ends of the rails will be cast welded.

Electric Short Line Railroad, Minneapolis, Minn.—Steps are being taken by the citizens of Flandreau to have Flandreau made a station on the proposed new line which has been surveyed from Brookings southward through this section of the country. It is expected that a branch line will run from the main line in this vicinity westward to Mitchell via Rutland, while the main line will run southward to Sioux Falls and ultimately to Sioux City. It is believed the main line will reach Flandreau and extend east of the Milwaukee Railroad extending from Sioux Falls to Egan far enough to tap an extensive strip of country which now is entirely without railroad facilities.

Minnesota Central Railway, Minneapolis, Minn.—At a recent meeting of the directors of this company at Duluth it was decided to add about 7 miles of trackage to the original plans, so as to provide for a branch line from Ironton-Crosby to Cuyuna, and beyond to Manganese and Iron Mountain. This will make the proposed line about 45 miles long. This is part of a plan to build a line between Minneapolis, St. Cloud and Brainerd. Joseph Ferrier, Brainerd, vice-president. [E. R. J., Nov. 15, '13.]

Twin City Rapid Transit Company, Minneapolis, Minn.—The 1914 program of improvements and reconstruction work was recently announced. Two new routes will be built this summer in St. Paul, the Dale Street crosstown line and the Western Avenue line. The entire Dale Street route will be double tracked. A new line will be constructed as a branch of the Rondo and Maria line out Burns Avenue to Clarence Street. Completion of the Seven Corners loop and the paving of University Avenue are two of the large improvements the company will make. Other reconstruction work to be begun soon will be the rebuilding of the trackage and paving of Shelling Avenue from Selby Avenue to Grande Avenue in St. Paul.

St. Paul Southern Electric Railway, St. Paul, Minn.—This company announces that it will begin operation on the first section of its line between St. Paul and Hastings, Minn., June 1, 1914.

Hattiesburg (Miss.) Traction Company.—During the next few weeks this company will relay 5000 ft. of track in the paved district in Hattiesburg, using girder rails.

United Traction Company, Albany, N. Y.—Arrangements are being made for the extension of this railway to the Temperance Hill section of Watervliet.

Jamestown (N. Y.) Street Railway.—This company has asked to consider plans for an extension through Brooklyn Heights, via Baker, Palmer and Halleck Streets and Fairmont Avenue, Jamestown.

Meigs Valley Traction Company, Caldwell, Ohio.—Right-of-way has been secured and preliminary arrangements are being made for the construction of this line from Beverly to Pleasant City with a spur from McConnelsville to Crooksville. The line will connect at Beverly with the Parkersburg, Mariette & Interurban Railway and a branch will be built from Cambridge through Coshocton to New Philadelphia, where it will connect with the interurban to Cleveland. E. R. Myers is interested. [E. R. J., April 4, '14.]

Cincinnati, Lawrenceburg & Aurora Electric Street Railway, Cincinnati, Ohio.—This company's bridges at Lawrenceburg were recently carried away by high water. The company will replace them at once.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—Representatives of this company, Messrs. Breidinger and Clifford, met with the City Council of Barberton, Ohio, on April 2 to discuss the franchise desired to allow the construction of tracks on Frederick Street. They assured members of Council that the contract for the construction of the railway had been awarded and that work would begin on May 1. It must be completed to Orrville within one year. [E. R. J., Nov. 25, '11.]

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—An extension to Packard Park in Warren is being contemplated by this company.

Sapulpa (Okla.) Interurban Railway.—During the next few weeks this company plans to build a 1-mile extension to the City Park in Sapulpa.

Oshawa (Ont.) Railway.—During the next few weeks this company plans to build about 1500 ft. of new track in Oshawa.

Erie & Ontario Railway, Port Maitland, Ont.—Objections raised by the Hydro-Electric Commission of Ontario caused the elimination from the Erie & Ontario Railway bill of the clause giving the company certain rights for the development of water powers. The bill was passed, however, to allow the company to build from Port Maitland on Lake Erie, one line going to Smithville and another to Port Colborne. [E. R. J., Feb. 7, '14.]

Forest Hill Electric Railway, Toronto, Ont.—The Railway Committee of the Ontario Legislature has granted this company an extension of time until Dec. 15, 1914, in which to begin the construction of the line, and also to increase the bonding powers so that the bond issue could be increased from $30,000 per mile, as provided in last year's bill, to $40,000 per mile. [E. R. J., April 4, '14.]

Southern Oregon Traction Company, Medford, Ore.—Work will be begun at once by this company on the extension of its lines from the Siskiyou Heights addition east and north to the city reservoir, about 1 mile. Further extension will be made if arrangements can be made with the property owners.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—This company has placed in operation its line between Schaefferstown and Ephrata.

Manila Electric Railroad & Light Company, Manila, P. I.—Plans are being made by this company to extend its electric railway and electric power lines into some of the near-by provinces of Luzon. The extensions are said to include a railway to Paranaque, a further extension of the Malabon line to Obando, and electric lighting lines to near-by towns. The basin of the Angat River will be made the site of the hydroelectric plant the company plans to install to furnish power. T. W. Swift, president.

Moose Jaw (Sask.) Electric Railway.—An extension of the Hall Street line to Laurier Avenue in Moose Jaw is being planned by this company. Another extension from Main Street eastward on Hall Street for ½ mile will also be built.

Regina (Sask.) Municipal Railway.—Plans are being considered by this company to extend its lines in Regina at a cost of $250,000.

***Nashville, Tenn.**—The project to construct an electric railway from Nashville, Tenn., to Corinth, Miss., is being actively pushed by citizens of the towns along the proposed line, which would make the Nashville-Franklin Interurban Railway and the Middle Tennessee Traction Company from Franklin to Mt. Pleasant links in the completed railroad. Surveys are being made from Corinth for the purpose of locating the best route from that end. The Corinth Business Men's Club has undertaken to promote the construction of the line in that part of the country, and prospects seem favorable to some action this summer.

Fort Worth & Denton Interurban Railway, Fort Worth, Tex.—Preliminary work for the construction of the electric line between Fort Worth and Denton has been completed. The financing also is arranged for. E. E. Baldridge, Fort Worth, president. [E. R. J., March 14, '14.]

Seattle, Wash.—Councilman Oliver T. Erickson has introduced a resolution authorizing and directing the Board of Public Works to prepare plans and specifications immediately for Division B of the Municipal Street Railway in Seattle. This plan anticipates a connection between Division A and Division B by taking advantage of the common user provision covering the Fourth Avenue and Fourth Avenue South line of the Seattle, Renton & Southern Railroad, but in order to take advantage of this provision it will be necessary for the City Council to first repeal an ordinance passed three years ago revoking the franchise to that company.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—Work has been begun by this company on the extension between Eau Claire and Altoona.

SHOPS AND BUILDINGS

East St. Louis & Suburban Railway, East St. Louis, Ill.—Work has been begun by this company on its new passenger station at Collinsville Avenue and Main Street in East St. Louis. [E. R. J., Feb. 21, '14.]

St. John (N. B.) Suburban Railway.—Bids are being asked by this company to build a new carhouse to adjoin the present carhouses on Wentworth Street in St. John. The new structure is to be built with brick walls on concrete foundations. The entire frame will be of structural steel, and the floors are to be of reinforced concrete.

Public Service Railway, Newark, N. J.—Work will be begun at once by this company on its new terminal station on lower Broadway in Paterson. All the electric lines entering the city and those within the city limits will pass through the new terminal. Several of the present storage tracks will be removed and a new double track loop built to accommodate the extra lines. The new property purchased by the company adjoins that of the present terminal on the west. A new carhouse similar to the one at Market street will be constructed. It will be for the greater part concrete and steel, and will cover the entire property. Besides accommodations for the storage of upward of eighty cars, the new building will contain the mechanics' room, starter's office, locker rooms for the crews and social rooms for the men. It will also be equipped with modern appliances for the rapid repair of cars. The new property will be used entirely for storage and will contain tracks for about forty cars.

Lehigh Valley Transit Company, Allentown, Pa.—A new passenger station and dispatcher's office will soon be built by this company at Wales Junction.

POWER HOUSES AND SUBSTATIONS

St. Petersburg Electric Light & Power Company, St. Petersburg, Fla.—This company has completed its new power house at Second Avenue and Fifteenth Street, north, in St. Petersburg. The capacity of the new plant is 1500 kw. The cost is estimated to be about $175,000.

United Railways of St. Louis, St. Louis, Mo.—This company will add new substation apparatus to its equipment consisting of a 2000-kw rotary converter, 2200-kva air-blast transformer, switches and accessories. The order for this apparatus has been placed with the General Electric Company.

Niobrara, Sioux City & Omaha Railway, Omaha, Neb—Work has been begun by this company on its new hydroelectric power plant in Niobrara which will be located on the Niobrara River. At the Niobrara head works 28,000 hp will be developed at the start with 47,000 hp held in an available reserve. It is proposed by the company to construct transmission lines to Norfolk, Omaha, Lincoln and Sioux City.

United Traction Company, Albany, N. Y.—This company will add to its substation equipment three 200-kva, 11,000-volt transformers and a 600-kw rotary converter. The apparatus has been ordered from the General Electric Company.

Oshawa (Ont.) Railway.—This company is installing a new motor generator at its power house in Oshawa.

Nashville Railway & Light Company, Nashville, Tenn.—Arrangements are being made by this company to build a new concrete smokestack at its Cumberland River power plant in Nashville. The smokestack will be 150 ft. high and 12 ft. in diameter inside and will replace two steel stacks 200 ft. high and 12 ft. in diameter.

San Angelo (Tex.) Street Car Company.—Work will be begun shortly by this company on its new power house in San Angelo. The cost to build and equip the new structure is estimated by the company at about $35,000.

Charleston-Dunbar Traction Company, Charleston, W. Va.—This company has installed in its power house at Dunbar a 375-kva Curtis turbo-generator, 300-kva, two-unit three-bearing synchronous motor-generator set and switchboard. The order for this equipment was placed with the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn., expects to purchase one car.

Fitchburg & Leominster Street Railway, Fitchburg, Mass., is reported as expecting to buy one car.

Rhode Island Company, Providence, R. I., has issued inquiries for equipment on five new cars.

Quebec Railway, Light & Power Company, Quebec, Que., is refitting from four to six cars in its own shops.

Columbia Railway, Gas & Electric Company, Columbia, S. C., will build two 53-ft. cars in its own shops.

Waterville, Fairfield & Oakland Railway, Waterville, Me., is reported to be building one car in its own shops.

Dayton (Ohio) Street Railway has ordered five single-end pay-as-you-enter cars from the Cincinnati Car Company.

Jamestown, Westfield & Northwestern Railway, Jamestown, N. Y., has ordered one work car body from the Cincinnati Car Company.

Union Electric Company, Dubuque, Ia., has ordered six 41-ft. two-motor maximum-traction truck cars from the American Car Company.

Manhattan & Queens Traction Corporation, New York, N. Y., is overhauling sixteen of its former Third Avenue Railway cars. New curtains and seats are being installed in the cars.

Manhattan Bridge Three Cent Fare Line, Brooklyn, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1914, as expecting to purchase six closed passenger cars, has ordered these cars from the Southern Car Company.

Montreal (Que.) Tramways was incorrectly noted in the ELECTRIC RAILWAY JOURNAL of March 21, 1914, as expecting to purchase 100 new cars. This company is not at present contemplating the purchase of new cars.

Northwestern Pacific Railroad, San Francisco, Cal., is reported as expecting to order thirteen motor cars to be used in the extension of the electric service from San Rafael to Petaluma and possibly Santa Rosa. The cars will have a capacity of seventy passengers each. Two gasoline-electric cars, with a capacity of fifty passengers each, are included in the new order.

Municipal Railway of San Francisco, Cal., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 17, 1914, as having ordered 100 California-type, pay-as-you-enter cars from the Jewett Car Company, has increased this order to 125 cars. The following details are specified:

Seating capacity.....50	Curtain material..Pantasote
Weight, including elec. equipment .....24,000 lb.	Destination signs, Elec. Serv. Sup. Co.
Bolster centers, length, 20 ft. 10 in.	Fare boxes.....Johnson
Length of body....32 ft. 5 in.	Fenders..Eclipse Life Guard
Length over vestibule, 47 ft. 1 in.	Gears and pinions, R. D. Nuttall Co.
Width over sills.....9 ft.	Gongs.....12 in. foot gong
Width over all..9 ft. 2½ in.	Hand brakes.....Peacock
Height, rail to sills, 2 ft. 7 13/16 in.	Headlights.....Golden Glow
Height, sill to trolley base, 8 ft. 11¾ in.	Journal boxes.....Baldwin
Body .....metal	Motors, West. 306-CA-4, outside hung
Interior trim.....red birch	Paint.....auto gray
Roof.....plain arch	Sanders.....air operated
Underframe .....metal	Seats.Hey Bros. & Wakefield
Air brakes.....West.	Seating material...red birch
Axles.....forged steel	Step treads.....Mason
Bumpers.....8 in. channel	Trolley catchers.....Ideal
Cables .....West.	Trolley base.....U. S. No. 14
Conduits and junction boxes, West.	Trucks....Baldwin "L plate"
Control, type, West. H. L. unit switch	Varnish..Valentine & Hueter
Curtain fixtures.Cur. Sup. Co.	Ventilators....ry. co. design
	Wheels....34 in. rolled steel
	Special devices, steel floor mats

TRADE NOTES

Buda Company, Chicago, Ill., has appointed C. H. Bull as manager of its railway motor car department, with office at Harvey, Ill.

Wagner Electric Manufacturing Company, St. Louis, Mo., has opened a branch office in Suite 524, Syracuse University Block, Syracuse, N. Y., under the charge of J. W. Bryant, resident agent.

Meikleham & Dinsmore, New York, N. Y., announce that W. H. Padgett of Philadelphia has recently become associated with them, with headquarters at 1421 Chestnut Street, Philadelphia, Pa.

Esterline Company, Indianapolis, Ind., has been awarded a contract for 172 "Golden Glow" headlights for the city and suburban cars of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

F. B. H. Paine has opened an office as consulting engineer at 26 Cortlandt street, New York. He will specialize on corporate management, commission problems, the inter-relations of utilities and electric and gas contracts.

R. W. Cameron & Company, New York, N. Y., exporters, have received an inquiry from an electric railway in Australia for a storage-battery motor truck to be equipped with a jib crane with lifting capacity of 3360 lb., for lifting armatures and for general shop work.

Carnegie Steel Company, Pittsburgh, Pa., has received an order from the International Railways, Buffalo, N. Y., for 20,000 steel ties. This order is believed to be the largest order for steel ties ever placed by an electric railway.

William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., has appointed James C. H. Ferguson as Pacific Coast representative, with office in the Monadnock Building, San Francisco, Cal. Mr. Ferguson recently resigned from the position of Pacific Coast sales agent of the Midvale Steel Company, Philadelphia, Pa., which he has held for the past thirteen years.

Frank N. Grigg, Richmond, Va., for the past year district manager of the Standard Heat & Ventilation Company, with office at Washington, D. C., has been appointed sales agent for the Southeastern and Southern district of the Transportation Utilities Company, New York, N. Y., and the Rostand Manufacturing Company, Milford, Conn. His office is in Room 1201, Virginia Railway & Power Building, Richmond, Va. Mr. Grigg formerly spent ten years in the motive power and stores department of the Chesapeake & Ohio Railway. He left the railway field in January, 1903, to become eastern representative of the Adams & Westlake Company.

ADVERTISING LITERATURE

Waterhouse Welding Company, Boston, Mass., has issued a catalog describing and illustrating its welding and cutting plants.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder describing its steel out-door substations.

Railway Improvement Company, New York, N. Y., has issued a poster entitled "Making the Strap Hangers Happy" in connection with its Rico sanitary straps.

American Emery Wheel Works, Providence, R. I., has reprinted a chart from "Grinding Wheels," which was compiled and copyrighted in 1913 by the Independence Inspection Bureau of Philadelphia and Chicago. The chart analyzes the various causes of grinding wheel accidents.

Busch-Sulzer Brothers-Diesel Engine Company, St. Louis, Mo., has issued a pamphlet describing the Diesel engine which this company is now building for all classes of service in the United States. The pamphlet, which is made up in very attractive form and is profusely illustrated, contains a historical sketch of the Diesel engine and an outline of the reasons for its low fuel consumption over a wide range of loads. The economy is shown by several diagrams which compare its operation with that of steam engines, and, in connection with this, the guarantees of the builders are briefly explained. The pamphlet also includes material descriptive of the theory of the Diesel engine, together with a list of installations in industrial plants throughout the country.

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For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.), Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.

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